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Fossil and Non-Fossil Sources of Energy with Reference to the Resources of Tamil Nadu

Indian Economic Perspectives

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EDITORIAL - SOME HIGHLIGHTS

I General Economic Scene

State

Weather and Prices

June witnessed the start of the South West monsoon in the southern parts of the state. The reservoirs were receiving copious rains with positive effects on the power situation, to be referred to later. The drought relief projects employed 2 lakh persons every day and upto May end 51 lakh mandays of employment were generated. Upto that point the government had sanctioned Rs. 39.54 crores for drought relief, 40 per cent of which was spent on providing drinking water to the drought-hit population. The Union government as noted in the last issue p. 315 had provided Rs. 48.90 crores for the drought relief programme which could go on till the North East monsoon started at the end of September. There is one problem faced by the state, and that is the inadequate supply of paddy from the Union. Against a promise to supply 85,000 tonnes of rice a month, the actual Union allotment was 25,000-30,000 tonnes a month. The resulting monthly shortfall was not being carried over to the subsequent months. The offtake of rice through the public distribution system which was 11,000 tonnes a month in September/October 1980, had increased to 60,000 tonnes in April/May. This involves a government monthly subsidy of Rs. 12-15 crores to distribute rice at Rs. 1.75 a kg to card holders. The levy is to be continued till the kuruvai season to feed the public distribution system. CSO's monthly report shows that prices jumped by nearly 4 per cent in July 1980 at 383 compared to the previous month. The rural price series shows that rural food prices rose sharply by 5 per cent, 15 points in July, while general rural prices rose by 4 per cent—13 points. The intercity price series for August show the highest and largest points rise for Madras at 384 and 4 points, followed by Trichy at 369 and 1 point and Madurai at 367 and 2 points.

Power

With effect from June 25 the 30 per cent power cut on HT industries and HT consumers was lifted, the 15 per cent cut on essential services industries having been lifted on June 1 and the 30 per cent cut on LT industries having been lifted on June 20 thus freeing power from any cut from that date in the state. This was due to (a) heavy rainfall in the

catchment areas of the hydel reservoirs from mid-June which brought copious inflows of the order of 30 million units a day resulting in the hydel storage of 610 million units by June 24, and (b) the increased power supply from Kerala from 3-4 million units a day to 5-5.5 million units daily. Earlier in the month, the state passed through some very anxious times because of the strike in Singareni and the very low coal position at Ennore and Tuticorin. On June 8, power generation at Ennore was reduced to 145 Mw, two 110 Mw units were shut down and only one 110 Mw and two 60 Mw units were working. The existing coal stocks were being carefully used to keep the minimum number of machines in proper working condition. A ship carrying 8,000 tonnes of coal to Tuticorin was diverted to Ennore but these emergency measures were at the cost of other thermal units. Fortunately the copious rains in Kerala from early June enabled that state to lift its reduction of one million units a day and increase its generation so that both Tamil Nadu and Kerala were able to receive increased power supply. A crash plan to increase the capacity of the 600 Mw thermal power station of the Neyveli Lignite Corporation is under consideration to increase the power supply of the state grid. NLC is planning to put up a tenth unit to the existing power station which will be a 100 Mw unit at a cost of Rs. 55 crores. This will replace the original plan for a 210 Mw unit which will take time and cost about double Rs. 105 crores. This unit will be supplied by BHEL and USSR's Technopromexport. The first power station, spartially run on oil till now, will be fully lignite based with the reconversion of the last 50 Mw unit (see Vol. III p. 160) to lignite. The oil based power costs four times the cost of lignite based power. Further the state's forestry scheme will help in the setting up of bio-mass thermal stations for rural electrification. Fire wood would be used instead of coal. Wood from 1,000 hectares of social forests can help electrify a village by a 10 Mw thermal station. In Madurai alone 25,000 hectares have been brought under social forest and can meet the fuel power needs of the district.

For the country as a whole, the power situation began improving at the end of June as the South West monsoon advanced over the country. The ministry of energy reports that power output in May increased by 19 per cent compared to May 1980 and exceeded the monthly target by 3 per cent. The power industry produced in May 10,204 million units against the target of 9,916 million units. Thermal generation is reported to have increased by 22 per cent and hydel by 14 per cent. The north eastern region contributed the maximum increase of 42 per cent followed by the eastern region (30 per cent), southern region (24 per cent), northern region (17 per cent) and western region (13 per cent). During the first 2 months of the year, April and May, power production increased by 10.4 per cent compared to April and May 1980. DVC reports a peak production of 63 per cent in May and as a result of improvement in the power supply from DVC, production in coal, steel and railways improved. DVC is currently helping the power supply in Calcutta. UP also reports power generation which had fallen to 600 Mw due to non-availability of coal increased in May and June to 1,023 Mw. The UP Board reports increasing generation to an average of 30 to 33 million units. Madhya Pradesh however reports poor generation due to the unsatisfactory running of 3 thermal sets and the delay in the stabilisation of the power sets in the Sarni Station. Rajasthan

is currently faced with serious power cuts due to both units of RAPP going off the circuit and affecting the functioning of the major mines of copper, zinc and lead, metal smelters and cement units. DVC reports that it is adding 2 units of 210 Mw each at the Bokaro thermal plant as a result of which DVC's total installed capacity will increase to 2,221.5 Mw. The delay in the implementation of the 15 hydro power projects following interstate disputes will increase their cost by an additional Rs. 1,250 crores. The delay of 4-5 years have increased their cost from Rs. 1,250 crores to Rs. 2,500 crores The projects include those located in the Cauvery basin, Yamuna basin and Ravi-Beas basin. The Union government has suggested that the states hand over these projects to the Union for execution. The two major recommendations of the Rajadhyaksha Committee (see Vol. X. p. 525) on restructuring the State Electricity Boards and creation of a separate consultancy for the power industry is opposed in the first case by the states and in the second by CEA. The country's nuclear power programme for the year includes one more power reactor—Rajasthan Unit II—and two heavy water plants—Baroda and Tuticorin. Tarapur has completed 11 years generating 1,646 million units, of which 683 Mu went to Maharashtra and 849 Mu to Gujarat. Civil works for the Norara Project in UP have been completed and its two units may be ready in 1985-87. The Ministry of Agriculture reports that it has drawn up plans for establishing 1 million gobar gas plants by 1985 with the Rs. 50 crores sanctioned by the Planning Commission, with its accent on low cost technology, involvement of more agencies, and organisation of training programmes. In addition to the 80,000 plants producing 131.22 million cubic metres, KVIC plans to install 20,000 plants this year. To reduce the cost of the plant, it proposed to replace the steel drum by a brick and cement dome.

Water

Tamil Nadu, Karnataka, Kerala and Pondicherry have forwarded to the Centre their final proposals on the sharing of Cauvery waters and a meeting of the Chief Ministers of these states is likely to be held early in July with a view to arriving at an agreement. This however seems unlikely as each state simply reiterated its proposal. Tamil Nadu wants the 1924 agreement to be continued and is opposed to the 1976 formula under which it is expected to save 100 tmc ft of water through modernisation of its irrigation systems and make the saved water available to the other states. Karnataka has reiterated its 10 point plan proposed at the Madras meeting in December 1980 (see Vol. XI p. 68) which envisages assessment of the total yield available for distribution as the basis of average yield for a long period of 60 years and the prevention of any diversion of water outside the basin for power generation or irrigation. It proposes an equitable distribution of the available water against the present lopsided development of irrigation. It wants that the aggregate quality of water to be assessed should include surface and ground water. Kerala wants the water it needs for its approved projects and to use the water for both irrigation and hydel purposes. The release of water from Mettur which was scheduled for June 12 was postponed due to the inadequate storage position at that time—but with the increased inflow from June 20, the release was mid-July. Water supply to Madras city was reduced by 10 per cent from mid June as the levels

in the reservoirs continued to decrease. Together the reservoirs were holding less than half the volume of water they did at mid-June in 1980 but with bore wells and tube wells at Panchilli, Tondiarpet and Adyar the daily reduction is only 22 million litres. The huge 15 tonnes x 6 metres x 1.67 metres diameter ex-Veeranam pipes numbering over 10,000 are being considered for use as overhead tanks on the suggestion of NLC. Each pipe can store 14,000 litres of water and can be used in the drought-hit areas. The state government has taken up all the repair works in the Mullaperiyar dam to ensure the dam's safety. Kerala and Tamil Nadu governments agree that water can be stored upto 136 feet and in the rainy season upto 145 feet. When the strengthening works are complete, the water level can go beyond 145 feet.

Transportation

As noted in the last issue p. 318 the district wing of the Pallavan Transport Corporation is being replaced by a new corporation called the Pattukottai Azhagiri Transport Corporotion with its head quarters in Vellore, and operating in North Arcot district and North Chengalpattu district. The government has also set guidelines and norms for allocating existing bus routes and development of new ones by the two corporations. Madras harbour reports that for the first time it has received a one lakh tonnes ore ship to take on a record quantity of 96,700 tonnes of iron ore fines being exported to South Korea by MMTC. Loading of the ores was at the mechanised Bharathi Docks at the outer harbour. Against this, the increasing congestion at ports is causing loss to commerce and foreign trade. Even the Madras port which had a record in 1980-81, had in May 11 ships, including 7 cargo ships waiting for berths, mainly due to the sharp increase in traffic—the port handling 72 ships in May 1980 and 97 vessels in May 1981. The Jawahar dock is being extended and it was being urged by the Union government to speed up the completion of the wet dock expansion project so that the port could handle 16 million tones of cargo by 1985-86. The railway ministry announced in June that work on the first phase of the Rs. 42 crore Karur-Dindigul-Tuticorin railway project will start in August. It will involve conversion of the existing metre gauge into broad gauge for a certain length and construction of new broad gauge line for the remaining position. The mass rapid transit system in Madras city, it was stated, has been approved in principle, but in view of resource constraints, is likely to be taken up next year.

Housing

The Tamil Nadu Housing Board announced its future plans for housing the low income group (LIG). Its Madurai unit had allotted 1,470 houses for government employees and 335 more were under construction. Under the hire purchase system 1,137 houses were built for the economically weaker sections and 217 were under construction. 200 houses have been built for labourers, 562 houses nearing completion and 120 more houses are to be built for them. Under the slum clearance scheme, 1,446 houses have been built and a further 1,800 houses are under construction. For the middle income group (MIG) 214 houses have been constructed, 166 nearing completion and 572 are to be constructed.

Farm loan arrears

With the improvement in the recovery of cooperative loan overdues—which fell

from 90 per cent to 60 per cent by the end of June, the Tamil Nadu Government expects to avert being black listed by the World Bank over its overdues position. The total overdues of farmers after allowing for all concessions announced by the government amounted to Rs. 200 crores, which in the main was due from large farmers (those with 10 acres and above). If the large farmers paid, the overdues will come down to 60 per cent. Tamil Nadu is uniquely in this position, the other heavy overdue states like Gujarat, Maharashtra and Karnataka having brought down their overdues to 40 per cent. Small farmers' loans to the tune of Rs. 118 crores were written off. The Munu Adhi Committee is at work trying to persuade the large farmers to pay back their dues. The Government has announced that fresh loans will not be made to those who have not repaid their arrears by June 30, 1981.

Relaxation of prohibition

The government announced that the 5,000 arrack shops which had been auctioned would bring in a revenue of Rs. 6.15 crores a month compared to the income of Rs. 6.50 crores for the year when prohibition was last relaxed in 1971-72. Another 300 shops are to be reauctioned. On toddy 7,000 out of 10,000 shops have been auctioned and will bring in a revenue of Rs. 1 crore a month, compared to Rs. 9 crores a year in 1971-72.

Conservation of wild life

A meeting of the Chief conservators of forests of Tamil Nadu, Kerala and Karnataka in June drew up measures for protecting and conserving wild life and vegetation in the Wynad-Nagerhole-Bandipur-Mudumalai reserves, using flying squads to restrain poaching. There will be a common network of wireless systems covering all 4 sanctuaries. It is hoped that these measures will also stop the elimination of tigers and panthers in Wynad, and the elephants in Bandipur and Mudumalai.

National

VI Plan

There are three issues which are affecting the Plan, to which the Commission proposes to give attention. One is the shortfall in the resources that should have been raised for their plans by the states; the second is the continued rise in prices and its effect on the real level of resources available to the plan, and the third is the effect of the census results. On the first count, the Union government is doing well with Rs. 5,140 crores being raised by additional taxes, Rs. 3,250 crores by reduction of subsidies and Rs. 3,900 crores through the rise in railway rates and administered prices. The tax measures in 1980-81 will raise Rs. 2,030 crores, leaving a balance of Rs. 3,100 crores to be raised in 1981-85, which is an average of Rs. 200-Rs. 300 crores. Even the public sector which is expected to raise Rs. 9,395 crores, a Commission study points out, will be raised largely by way of depreciation provision. The only dark spot in the Union picture is the deficit financing situation which may be well above what has been provided in the Plan. The states are expected to raise Rs 6,100 crores additionally in the first two years and a total of Rs. 9,012 crores over the 5 years; the only information now available is that Tamil Nadu, UP, Rajasthan and Orissa have taken financial action to close

their budgetary deficits but there is a suspicion that the states may not be raising the additional resources they have promised, in which case in the discussion between the commission and the states, the state plans will have to cut back. The second is the continuous rise in prices as against the plan assumption of price stability. The current inflation is fuelled by excess liquidity in the economy, where money expansion in 1980-81, unlike the forecast in Vol. X p. 529, was of the order of 16 per cent. On the positive side it should be noted that the states have geared up their machinery for monitoring the VI Plan programmes and their cells are sending periodic reviews to the Commission. Finally, the census figures have major implications for plan priorities which need to be looked at again. The base population figure for 1980 and the annual population growth for 1980-85 will have to be revised, the projections for the social programmes-health, education, minimum needs etc.—will have to be recast. The family planning programme has not yielded the expected results and what is more serious is the feeling that the Registrar General's projections cannot be reliably used for planning. Some states—the poorest among them, UP, Bihar, Rajasthan and MP—show high population growth rates and this needs to be given special attention. Further the rural-urban population differentials are rising, with a sharp rise in urban population. In Tamil Nadu 15.9 million people out of the total population of 48.3 million are in towns, which means the gravity of urban population has increased by 3.4 million. The Planning Commission reports that at a meeting of ICAR, ICMR and CSIR and state and Union governments, a package of measures for the rapid development of agricultural technology to help scheduled castes and backward classes has been developed involving: (a) the technology to be transferred will be economically viable, (b) it will be demonstrated to the community and there will be national linkages between various research organisations for the adoption of an integrated approach in the development of the poorer sections of society and in choosing the area of operation and the beneficiaries. The Commission has reviewed the support from banks to the Integrated Rural Development Programmes. In the VI Plan, Rs. 3,000 crores of bank credit is envisaged for the programme to attain the target of 15 million families crossing the poverty line. The Commission's finding is that at the present rate of credit flows to the programme, this level of lending will not be reached. The field functionaries found out the following problems in regard to bank credit for IRD: (a) absence of branches in backward and remote areas; (b) uneven spread of branches; (c) rigid banking hours; (d) lack of rural orientation among bank staff who are centrally recruited; (e) absence of uniform criteria on credit for weaker sections; (f) absence of control of lead bank officers over managers of other banks; (g) lack of expertise in project formulation at the district level; (h) inordinate delay in RBI giving licences for opening rural branches. The Commission has proposed corrective action on each of these 8 problems and asked the RBI to monitor the implementation of these recommendations and its own circulars.

Prices and Inflation

The wholesale price index for May recorded a rise of 1 per cent for the month, standing at 277.4 as at 30 May 1981. The major price rises during the month were recorded in primary articles, with oil seeds

prices rising by 2.6 per cent, cereals by 2.1 per cent, and pulses and fibres by 2 per cent each. Tyres and tubes rose by 3 per cent, electrical machinery by 2 per cent and metal products by 1.4 per cent. On the other hand the sugar group registered a decline of —5.1 per cent, jute group —7.1 per cent. A Financial Express price survey in June confirms the all-round rise in prices of nearly all commodities between January-June 1981, with edible oils moving up by 23 per cent followed by tea and coffee (8-28 per cent), pulses (3.50-8.70 per cent). The inflationary forces at work include the excess liquidity referred to earlier, and the mounting deficit of the state and Union governments. The state deficits amount to Rs. 1,126 crores against which their additional fiscal measures amount to Rs. 400 crores, leaving a gap of Rs. 800 crores. Against the Rs. 752 crores of additional resources to be mobilised by them, 11 have so far announced an additional Rs. 323 crores against their target of Rs. 500 crores. Not much progress is reported in the anti-inflation measures proposed of a rise in electricity rates, irrigation rates and bus fares. As far as the Union government is concerned the budgeted deficit for 1981-82 of Rs. 1,529 crores is likely to shoot up to Rs. 2,050 crores, given the Rs. 500 crores shortfall in the bearer bonds (see last issue p. 320). Thus all forces are moving the economy in an inflationary direction. As against this, the Agricultural Prices Commission has proposed to the government a new arrangement under which it makes recommendations on the support prices for various commodities applicable for 3 consecutive years. However if there is need, the price recommended for a particular commodity may be reviewed if some new factor has come into existence. This may have a stabilising effect. The Seal Commission report on consumer price index which will be ready in July will reflect the change in real income or the value of money for the first time, not taking into account the concept of DA. The family living survey will reflect the actual expenditure pattern in the country. The base year will be 1981 and it would be applicable from December 1983.

Central loan to RBI

In June the Union government made a private issue of Rs. 100 crores to the RBI which will be sold to investors in due course. With this the total borrowings of the Union government in 1981-82 amount to Rs. 760 crores against the budgeted borrowing of Rs. 2,800 crores.

Economy

CSO's national income statistics published in June show that the national product at current prices in 1978-79 was Rs.81,228 crores and per capita income Rs. 1,267, while at 1970-71 prices the national product was Rs. 46,636 crores and per capita income Rs. 728. Private income and personal income in relation to the net domestic product at factor cost which was 91 per cent in 1970-71 declined to 89 per cent in 1978-79, suggesting that the draft of the government in the form of indirect taxes has been growing faster than the domestic product. There is also recorded a gradual decline in the contribution of the primary sector from 50.1 per cent in 1970-71 to 43.9 per cent in 1978-79 at constant prices, with corresponding change in the secondary and infrastructure and no change in the service sector. The distribution of net domestic product by factor incomes for the economy and for the organised and unorganised sectors show little change, the compensation of employees in

1970-71 and 1977-78 being 38.7 per cent. The share of mixed income of self-employed gradually decreased from 46.7 per cent in 1970-71 to 43 per cent in 1978-79 due to the shrinking of the unorganised sector, offset by the increase in interest which raised its share from 5.2 per cent in 1971-72 to 7.6 per cent in 1978-79. The share of profit declined slightly due to profit decline in the public and private sector. A general impoverishment of workers in both the organised and unorganised sectors is noted, with compensation of employees declining from 72.4 per cent in 1976-77 to 68.2 per cent in 1978-79, while the share of interest increased from 10.6 per cent in 1970-71, to 12 per cent in 1976-77 and 13.3 per cent in 1978-79. In the unorganised sector compensation of employees declined from 26 per cent in 1970-71 to 24.5 per cent in 1978-79, while interest increased from 3.2 per cent to 4.7 per cent and the share of profits and dividends retained the same level of 15.8 per cent as in 1970-71. Private income declined from 91.4 per cent in 1970-71 to 90.5 in 1978-79, like personal incomes (from 89.9 per cent to 88.7 per cent) and personal disposable income (from 97.4 per cent to 96.9 per cent)—showing a gradual reduction of the private sector and household incomes in generation of the domestic product. There was also a shift in the consumption pattern of of higher expenditure group, its share of consumption expenditure on food, beverages and tobacco declining from 68.4 per cent in 1970-71 to 61.8 in 1978-79. Indirect taxes which were 9.6 per cent of gross product at market price in 1970-71 increased to 13.1 per cent in 1978-79. A study of the NDP by rural and urban areas shows that the ratio of per capita domestic product between rural and urban areas is 2:40 and the corresponding ratio in per capita consumer expenditure is 1 : 50, indicating that the rural-urban disparity in household consumer expenditure is less than in NDP and that there is a large net outflow of disposable income from urban to rural areas. Larger savings come from urban incomes and also urban incomes pay more taxes. Around 76 per cent of the rural income is from agriculture and is not taxable, while the corresponding urban group's share is 5 per cent. Higher income groups are more in urban than in rural areas. The World Bank's review of the Indian economy for the Aid India Consortium in June states that India has a strong agriculture and is no longer dependent on food imports. The industrial base is large and diversified, savings and investments are high, there is a high level of foreign exchange reserves, low level of debt and substantial capacity for borrowing. Its growing demand on petroleum, fertilisers, edible oils and steel will involve it in difficult balance of payments position.

Industry and Public sector performance

CSO's quick estimates report that in 1980-81 industrial growth registered 3.6 per cent compared to a decline of 1.4 per cent in 1979-80. In January-March 1981 the growth was 8.2 per cent compared to January-March 1980. A study of the provisional production data of 148 selected industries during April-February 1980-81 showed that 96 industries accounting for a weight of 64.2 per cent in the industrial production index registered a positive growth rate, with 52 recording more than 10 per cent. The industry ministry has proposed to the Union cabinet a three point strategy of preventing sickness in mills, quick rehabilitation of units that go red and an early decision on the future of such units. It also proposed for lines of production that are critical to the economy, those with many

ancillaries and those with large scale employment, nationalisation in case employment is over 1,000 persons or investment over Rs. 2 crores. As of now managements of 52 undertakings have been taken over for varying periods of time. In the case of state governments' proposals for takeover, if they are prepared to use their legislative power for such take over, the Union government will help by taking over for 6 months. As soon as indications of sickness are seen banks should take up a diagnostic study of the unit and help initiate corrective measures. IDBI should train a cadre of managers for the taken over units. The Ministry of Industry reports that DGTD units recorded a growth of 13.1 per cent in April 1981 compared to April 1980. Growth in 35 industries was 25 per cent, in 35 others between 10 and 25 per cent and in 33 industries it was 10 per cent. Negative growth was recorded by 39 industries. The industries with more than 25 per cent increase included nitrogenous fertilisers, aluminium, newsprint, commercial vehicles, passenger cars, agricultural tractors etc while those with negative growth included leather and rubber footwear, cycle tyres, synthetic detergents etc. The CSO report on 1980-81 shows that the Union public sector undertakings' growth was 3 per cent. The units which recorded growth include steel, minerals and metals, chemicals and pharmaceuticals, heavy engineering and consumer goods. Public sector undertakings under the control of the Department of Industrial Development achieved in April 1981 a production of Rs. 13.19 crores which is 68 56 per cent of the target of Rs. 19.24 crores. The units which exceeded the target are National Newsprint, Instrumentation (over 100 per cent), Hindustan Cables, Andrew Yule, and National Instruments (over 80 per cent). The sharp and continuous rise of raw materials and distribution costs (steel over 20 per cent, aluminium over 20 per cent, pig iron over 40 per cent, coal 16 per cent, petrol 19 per cent) is seriously affecting the production, and profits of the engineering industry, according to an AEI report. This cost push inflation is acting as a constraint to investment and production. The public sector units under Department of Heavy Industry achieved 87 per cent of the production target of Rs. 101.13 crores in May 1981. Production in May was worth Rs. 88.40 crores. Units which exceeded their targets are HMT, Burn Standard, Bharath Heavy Plates, Bharath Pumps and Lagan Jute. The all India convention on corrosion meeting in Bombay in May noted that due to corrosion of industrial plants and power stations, the country loses about Rs. 600 crores a year and so action against corrosion should be considered as part of industrial investment.

National Production Front

Steel

SAIL announced in June that it is examining the possibility of increasing steel production for the year by 10 per cent over the target of 7.28 million tonnes of saleable steel. If the mini steel sector produces 1.6 million tonnes, total production without the 10 per cent increase will be 8.9 million tonnes against the demand of 10.5 million tonnes. With the 10 per cent increase, imports can be reduced. Production of saleable steel in SAIL plants in May was 4,11,406 tonnes agains 4,00,300 tonnes in April. Bhilai's production was constrained due to power shortage, but with improved power from DVC, Bokaro maintained its record-breaking production in May as in April with 1,56,021

tonnes of ingot production. The saleable steel output by the SAIL plants in April and May was 32 per cent higher than the April-May 1980 production. In addition to Bokaro, Durgapur exceeded its April output by 9,800 tonnes at 70,088 tonnes, IISCO by 1,197 tonnes at 44,497 tonnes. However the coal supply position continues about the SAIL plants reaching their to cause anxiety increased production target. The Department of coal indicates a total availability of 15.3 million tonnes against a require ment of 16.06 million tonnes with an ash content of 20.5 per cent against the required 19 per cent. On the other hand SAIL reports that its plants and TISCO have made a major contribution to energy conservation by registering a 7 per cent decrease in power consumption. Bokaro reports that its blast furnace No. 4—the first unit of the 4 million stage was commissioned at the end of May. TISCO reports that the Rs. 100 crores sanctioned from the Steel Development Fund for its modernisation will increase its steel production by 10 per cent to 1.7 million tonnes. However the expansion and modernisation plan of Bhilai is reported to be delayed due to severe constraints of manpower and energy resouces. SAIL has submitted a proposal to Fazal Committee (See Vol. XI p. 8) on splitting the SAIL plants into 3 regional complexes—with Durgapur, Burnpur, Haldia in the eastern zone, Rourkela, Bokaro and Paradeep in the central zone and Bhilai, Vizag, Salem and Vijayanagar in the southern zone for more effective administrative control. The proposal should not involve more bureaucracy and red tape.

Crude

The government estimates the total requirement of crude in 1981-82 at 31 million tonnes. Indigenous production is 16.9 million tonnes and imports 16 million tonnes of crude and 5.77 million tonnes of petroleum products at a foreign exchange cost of Rs. 5,500 crores. ONGC will produce 5.3 million tonnes of crude and 925 million cubic metres of gas in 1981-82. In June a series of government announcements opened up oil prospecting and drilling to foreign companies. ONGC announced that it is going in for Canadian technology for stimulation of 200 sick oil wells of North Gujarat fields, using the $ 15 million CIDA credit. It also has a Soviet offer to treat sick wells of which there are 250. Bombay off shore, which has been the ONGC operating area, is to be opened to foreign companies for oil exploration as part of the demarcation of blocks proposed by the minister. Similarly the Godavari basin which was also reserved for ONGC and which has the expertise to drill upto 100 to 150 metres will now be opened to foreign firms if the drilling is to be in deeper waters of 300 metres. OIL is to engage a US company to study seismic and well data of the region to confirm the possibility of hydrocarbon before resuming drilling in the Mahanadi's basin. Oil India is experimenting with injecting certain chemicals to smoothen and hasten the pipeline flow and may if successful speed up pipeline flow in the country. The government reports taking a number of measures to conserve scarce petroleum products which include : (a) energy audit in public sector undertakings, (b) the use of nutan stove to reduce kerosene consumption for cooking, (c) the fitting of all diesel engines of trucks with turbo chargers which saves 15 per cent of diesel, (d) change in diesel operated irrigation pump sets to increase their efficiency by 30 per cent and test their quality (e) the redesigning of furnances using fuel oil so as to reduce consumption by 1.50 lakh tonnes. In addition the government is negotiating with EEC for the acquiring of

underground coal gassification technology in relation to the 40 million tonnes of coal now the subject of underground fires.

Coal

The government reports that coal production increased by 3.5 per cent during the first 2 months of the year, April-May, at 18.33 million tonnes and that coal production for the year will rise to 122 million tonnes against last year's 104 million tonnes. Due to industrial unrest, Singareni production declined during the 2 months. Singareni has asked for Rs. 90 crores more in addition to its allocation of Rs. 232 crores to meet cost escalation to increase output from 10 million tonnes to 17 million tonnes in 1984-85. The problem faced by major consumers in the south as a result of the Singareni strike continued to plague them in June. Cement industry received 8-10 wagons a day against a normal 100 wagons, the Railways cancelled 300 passenger trains of which the largest, 91, was from the South. The railways on their side claimed to be loading 10,000 wagons a day in March and April to meet the needs of power plants, cement plants, and steel mills. The South, however, faced shortages leading to cancelling of trains and closing down of some units of Ennore. Coal from CIL and Talcher by boat had to be diverted to these consumers to ensure maintenance of minimum service.

Nonferrous metals

With the discovery of new large zinc and lead deposits in Agucha and Deri in Rajasthan and in Gujarat, zinc production in the country is likely to increase. Hindustan Zinc has commissioned a pre-feasibility study for the construction of a concentrator and smelter which will cost Rs. 250 crores and will be commissioned in 1989. It would increase zinc production by 38,000 tonnes and lead production by 7,100 tonnes. This means that by the end of the century, zinc production will be 1.79 lakh tonnes against the demand of 1.8 lakh tonnes.

Sugar

There is a serious difference between sugar production prospects for 1980-81 and that for 1981-82. Cane production in the year 1980-81 is 152 million tonnes and for 1982 is expected to be 180 million tonnes. On this basis the government and ISMA estimate that with actual production from October-May 1980-81 at 50.41 lakh tonnes and in the remaining 4 months 1 lakh tonnes which may be produced, the total production for the year may not quite reach the target of 52 lakh tonnes. The offtake from factories for internal consumption during the 8 months was 30.48 lakh tonnes (against 36.45 lakh tonnes in that period in the previous year) and exports 60,000 (against the previous year's 2.30 lakh tonnes). Stocks at the end of May were 25.28 lakh tonnes (against the previous year's 20.7 lakh tonnes). The monthly releases at 4.51 lakh tonnes from June-September plus an additional release of 1.5 lakh tonnes for the festival season will leave a carryover of 6.7 lakh tonnes. At the end of June, the government announced import through STC of 2 lakh tonnes of sugar to augment the levy quota of 2.71 lakh tonnes per month. The state governments rightly point out that this figure is on the basis of a projected population of 628 million as on April 1978 which would ensure a per capita availability of 425 grams. But with the 1981 Census results showing the popula-

tion at 683 million, the levy sugar release should be 2.91 lakh tonnes per month. As the difference between landed cost and issue price of levy sugar is Rs. 100 per quintal, this will increase the government subsidy. The Development Council for the sugar industry discussed in June the recommendations of its expert committee to increase the free sale quota for weak sugar factories to 70 per cent of the sugar they produced in excess of the average of the last 5 seasons, with 50 per cent of the realisation from the extra free sale to be funded separately for sugarcane development. The recommendations also included fuller restrictions on the khandasari units in the areas reserved for sugar factories, use of improved cane varieties and modernisation of units. The recommendation will be reviewed by the Council and government again. For 1981-82 the government forecasts a production of 64-65 lakh tonnes. Of the 76 lakh tonnes licensed capacity, the installed capacity is 63 lakh tonnes. 23 new sugar factories of 13 lakh tonnes capacity are being established while 86 licences for expansion have not yet been implemented.

Drugs, Cement and Fertilisers

As part of the industrial policy statement (see vol. X pp. 412&413) regularising excess capacity, all DGTD drug units will be entitled for larger allocations of raw materials. This allocation will be on the basis of highest production achieved during the 3 years ending March 31, 1981. Also in June, the government revised the prices of 14 more bulk drugs and five formulations. The Union government announced in June its intention of setting up cement plants in the north east region because of the reluctance of the private sector to set up plants there, starting with a CCI plant in Mizoram and one in Arunachal Pradesh. The question of revising the retention price of cement is still under government study. For 1980-81 cement production was 18.50 million tonnes and with imports despatches were 20.10 million tonnes. Fertiliser production is not keeping pace with demand, in 1979-80 it was 2.226 million tonnes and imports were 1.295 million tonnes. With the completion of projects now under implementation, the capacity would increase to 6.85 million tonnes, with production at the end of VI Plan being 4.3 million tonnes while the consumption will be 6 million tonnes. To reduce dependence on imported sulphur, the Department of chemicals and fertilisers is to undertake the manufacture of nitrophosphate, which is a new fertiliser in the country, based on nitric acid instead of sulphur as the raw material. Of the 3 fertiliser plants, the one based on Bombay High gas and 2 of the proposed 11 phosphatic fertiliser plants are to manufacture nitrophosphate.

Agricultural production

First, the question of the 1980-81 foodgrain production. The government estimates that the production will be 131 million tonnes, rather than the original 135 million tonnes or the May revised target of 133 million tonnes (see vol. XI p. 266). Rice production was the only exception at 56 million tonnes against the target of 55 million tonnes. The reduced production was in wheat, pulses and oil seeds. Wheat production was 34 million tonnes rather than the expected 36 million tonnes, pulses 11.5 million tonnes rather than 12.5 million tonnes, and oil seeds 10.25 million tonnes in place of the 11 million tonnes target—due to rains and hail storms in Punjab

and Haryana and the karnal bunt for wheat, failure of rains in Rajasthan for pulses and lack of timely rains in oil seeds. The result of the production shortfall was that against the wheat procurement target of 9.5 million tonnes, as on June 19, arrivals were 6.30 million tonnes and procurement by FCI and the state agencies was 6.12 million tonnes, with the strong possibility that procurement may not quite touch 7 million tonnes this year. As on June 1 food stocks with the state and Union agencies were 12.80 million tonnes. If procurement in June is around 1.24 million tonnes, after providing for the offtake of 1 million tonnes for the public distribution system in June, the stocks on July 1 will be 13.04 million tonnes compared to 16.25 million tonnes on July 1, 1980, and 21.44 million tonnes on July 1, 1979 and the expert committee recommendation of 15 million tonnes as a minimum buffer including 3 million tonnes as operation stock. The reasons for the shortfall in procurement and this inadequate buffer position are manifold. First, in a predominantly rice consuming economy, wheat is only 25 per cent of our foodgrains output, so that wheat bears a major burden in our procurement policy. Second, procurement is from surplus producers who have now acquired a lot of staying power and can and do hold back supplies for higher prices. Third, our public distribution system is not only corrupt but hardly covers adequately the rural and semiurban areas so that really the government relies on the free market to effect the distribution in these areas and regulate prices. Fourth, on top of this, the government ran down its wheat stock in 1979-80 almost recklessly, it wrongly called the 1980-81 crop a bumper crop (see Vol. XI p. 133) because to be a real bumper it had not only to exceed the previous highest crop which was in 1979-80 but since population and national income had increased, output had to increase by 6 per cent over it, and that is at 137 million tonnes. So the 1980-81 crop was an average or above the average crop. And while the 1978-79 was preceded by a string of good harvests, 1980-81 was preceded by a drought year harvest. On top the unrealistic target, the reliance on the market to meet its procurement target, the Prime Minister's air dash to Chandigarh and the despatch of ministers to shore up the low procurement morale, the talk of food zones, levies, and restriction of stocks were clear signals to producers in Punjab, Haryana and UP who had the holding power to keep back supplies to await higher prices. Under these circumstances, it is necessary to accept the fact that we are under the control of the rich farmer and private trader for our procurement policies and an inadequate public distribution network, so that an increase in procurement prices leads to an increase in free market prices. To reduce instabilities, it is suggested that we regard 1980-81 as an average crop year and do not build up buffer stocks rapidly to increase market supply and bring down prices. Additionally a credit squeeze on foodgrain trade and more rapid recovery of credit from rich farmers along with no rapid changes in government policy might help. Punjab reports in June that karnal bunt spread over 8 districts and at a lower level in 8 districts in Haryana, affecting in all about 4 per cent of wheat stocks. The Union government's crop wheat watch group began meeting for the first time this season in June to monitor the progress of the monsoon and its impact on sowing activities all over the country. The state governments report launching a series of programmes for improved production of rice and coarse grains during the coming kharif season, including a large scale programme of raising community nurseries.

HYV rice area is to be increased from 18.4 million hectares in 1980-81 to 20.7 million hectares in 1981-82 and that for HYV coarse grains from 9.4 million hectares to 10 million hectares. Punjab reports Operation Kharif which aims at producing 34 lakh tonnes paddy. MP reports brighter prospects for kharif with an additional area of 8 lakh hectares due to the outbreak of the monsoon all over the state. Pulses production is likely to increase by 1 million tonnes in 1981-82, as a result of raising the area under cultivation and use of improved technology to reach 12.5 million tonnes. Also special emphasis is being laid on oilseeds production increase by expanding the area under rabi irrigated groundnut, rape seed, mustard and soya bean to attain 11.2 million tonnes. The government reports a shortfall in jute production this year by about 1 million bales compared to last year's 44 lakh bales due to the growers losing in growing jute and so switching to other crops. A Planning Commission group recommends the grant of adequate credit to ensure increased production and reasonable income to growers of perishable agricultural commodities in addition to establishment of consumption chains relating to production, planning, post harvest technology, transport, storage and marketing. If these were done the present production of 50 tonnes of fruits and vegetables can be doubled in 15 years. It has also recommended the setting up of a National Horticulture Promotion Board. These recommendations are being examined by government.

Export

The export of engineering capital goods in 1980-81 totalled Rs. 371 crores, exceeding the target by Rs. 25 crores and the total export of all engineering goods during that year is placed at Rs. 900.15 crores against the target of Rs. 915 crores, with shortfalls only in steel based and pig iron based items and consumer durables. Silk exports are on the increase with exports recording an increase of 25.8 per cent at Rs. 468.55 lakhs compared to the previous year's Rs. 372.46 lakhs. Pepper exports which during the 5 months—November to March 1980-81 amounted to 12,590 tonnes and the year ended October 1980 showed an increase of 6,888 tonnes to 25,266 tonnes. But with the lower crop this year, exports may decline. To promote exports, the Union government in June broad based duty draw back rates for exporters by including 47 new items eligible for this concession and increasing the existing rates for several products. The government is also considering extending credit guarantee cover to further new areas and for taking immediate steps to remove difficulties faced by exporters in their operations. In trade agreements with other countries, the five year agreement signed with EEC envisages liberalisation of trade, expanded economic, industrial, technological and scientific cooperation and increased investments. Similarly the government is holding talks to solve the problems facing garment exports to Greece. Also it has instructed that all proposals of export promotion councils to participate in international fairs be cleared by the Trade Fair Authority of India. Foreign collaboration proposals approved by the Union government increased by 85.5 per cent in 1980-81 over 1979-80 at 525. With US the number increased from 57 to 128 between the 2 years, with UK from 62 to 106, West Germany from 60 to 95 and Switzerland from 15 to 38. The largest number was in industrial machinery followed by electrical machinery, automobile and auto ancillary industries. The government also published in June the export quota

available for ready made garments under the first come first served contract reservation to US, EEC and Nordic countries.

Aid

The Aid-India consortium meeting in mid-June in Paris consisting of 13 industrialised countries pledged $ 3.45 billion (Rs 2,932 crores) for 1981-82. This was slightly more than last year's pledge of $ 3.41 billion but allowing for 10 per cent inflation was a slight decrease. Most countries maintained or marginally increased their pledges. Britain the largest single contributor pledged £ 100 million against last year's £ 117 million which was increased to £ 142 million. US increased its contribution from $ 104 million to $ 110 million. In SDRs, this pledge will be 2.82 billion against 2.73 billion last year. The World Bank's contribution remains at $ 2 billion, as last year. The French government decided to increase its aid by 10 per cent from $ 49.1 million in 1980-81.

International

IMF

IMF announced at the end of June that it has distributed $ 57.5 million in interest free subsidies to 23 developing countries. This has reduced the interest charges on outstanding IMF oil facility loans from 8 per cent to 3 per cent. IMF estimates that there are still $ 1.5 billion in oil facility loans unpaid including $ 700 million owed by UK.

UNEP

The United Nations Environment Programme called attention to the world problems of pollution of ground water, accumulation of toxic chemicals in food and over-exploitation of natural resources endangering the environment and the quality of life. It calls for well organised national food control systems to safeguard the people against exposure to foods containing high level of chemicals and biological contamination and for this purpose proposes control of production, use and disposal of pesticides, reduction in the use of chemicals and pesticides and stricter control of use of drugs in animal husbandry. To prevent contamination to ground water by industrial wastes, insecticides etc., it proposes that ground water management be a part of national overall water development, stringent scrutiny of new waste disposal practices and control on application of chemicals to land surface etc. Discussing the dilemma of cost-benefit analysis of environmental protection, it estimates that the economic cost of pollution damage in developed countries is 3-5 per cent of GNP, with lower costs in developing countries.

North-South meeting and ODA report

Preparations for the North-South summit meeting in October in Mexico are continuing with heads of governments exchanging notes on the major issues that are to be discussed at the meeting. The North-South Commission on third world development meeting in Berlin in June suggested a 4-point agenda for the Mexico summit comprising (a) a global food programme, (b) a global energy strategy (c) an increase in loans and investments for poorer countries, and (d) giving the international financial system a broader base. OECD's annual report for 1980 states that industrial countries made net disbursements of Official Development Assistance (ODA) totalling $ 26.7 billion

to developing countries in 1980, which was an increase of $ 4.3 billion over 1979. In real terms ODA increased by 9 per cent and as a share of the combined GNP of the industrialised countries rose from 0.35 to 0.37 per cent. The terms were soft, three quarters of all ODA being in grants. The total flow of financial resources—ODA and private and official non-concessional flows— amounted in 1980 to $ 73.2 billion, which was $ 1.8 billion less than in 1979 and represented 1.02 per cent of the combined GNP compared with 1.16 per cent in 1979. In this context a study by a West German economist shows that since 1977 some $ 1 trillion had been financed as official and private aid to developing countries but that this has not helped to integrate them into the prospering international economy. In the *First Development Decade*, though their growth rate was higher than that of the industrialised countries, the economic gap between them widened, their nutrition standards were deficient, their indebtedness rose by 15 per cent in 1968 and their debt servicing amounted to $ 4.7 billion in 1968, being a 12 per cent which was double their growth rate of export earnings. In the second development decade their per capita income rose by 2.9 per cent against the target of 3.5 per cent, their exports by 5.1 per cent, and imports by 5.4 per cent. These countries are the raw materials suppliers to the industrialised countries —100 per cent for rubber, 94 per cent for tobacco, 82 per cent for tin, 78 per cent for manganese and 45 per cent for bauxite. This dependence explains in fact the aid phenomenon. Stockholm's Peace Research Institute (SIPRA) in its 1981 year book reports that the world is edging closer to nuclear war, a 4 fold increase in military spending between 1949 and 1980, at the 1980 arms expenditure of $ 500 billion, with a serious growth in the Third world arms market, which is serious because this is where the next war could start.

World trade

The Bank of International Settlement in its 1980-81 annual report states that growth of world trade in 1980 was 1.5 per cent, which, except for 1975, was the lowest in the last two decades, compared to the 7 per cent in 1979. The 18-20 per cent world inflation sent up the dollar value of the 1980 world trade to $ 2,000 billion which was a rise of 21 per cent over 1979. Actually the volume of world trade declined by 3 per cent between the first and second halves of 1980. The most marked change was in the oil sector where the restrictive policies led to a 10 per cent decline in 1980 compared to the 3.5 per cent increase in 1979, followed by manufactures trade increasing by 3 per cent compared to 5.5 per cent in 1979, and agricultural products by 4 per cent compared to 7 per cent in 1979. OPEC oil exports declined by 14 per cent, grain exports from industrialised countries declined by 3 per cent, while real exports of non-oil exporting developing countries remained stable. On the imports side the group of ten imports slowed from 8 per cent in 1979 to 1 per cent in 1980, from 8 to 2 per cent for other industrialised countries and 12 to 6 per cent for the non-oil developing countries. The non-OPEC countries terms of trade deteriorated by 6 per cent for the industrialised and the same 6 per cent for the non-oil producing developing countries. For the OPEC countries the terms of trade increased by 46 per cent. The OPEC countries trade surplus increased by $ 56 billion. In this situation, the industrialised countries are able to meet this situation by recycling of petro-dollars—a device which is unavailable or available to a very limited

extent and at high cost to the developing countries.

World food

FAO forecasts a record wheat harvest this year due to good weather in the North. It is likely to increase from last year's 444 million metric tonnes to 460-480 million metric tonnes. Output of corn and barley will rise from 724 million metric tonnes to 750-800 million metric tonnes. Grain reserves will be 14 per cent of 1981 consumption (against the FAO norm of 17 per cent). World trade in wheat and coarse grains will be 200 million tonnes against the previous year's 192 million tonnes.

World population

UNFPA in a study reports that the declining trend in global fertility has been maintained and so the world population is expected to stabilise at 10.5 billion, which is 2½ times the present level by 2110. The eventual world population could be as high as 14.2 billion or as low as 8 billion depending upon the population policies followed. Till 1950 no government thought of population control as more population meant more tax payers, more workers, and more soldiers. Since 1950 there has been a quiet revolution with family planning being adopted by all countries. There are 3 scenarios drawn up by UNFPA. If the rate of fertility decline is low, stabilisation will take place after 150 years at 14.2 billion. If it is high, stabilisation will be in 60 years at 8 billions. If it is at the present level it will be in 130 years at 10.5 billion. In 1973 world population was growing at 1.95 per cent per annum and in 1980 at 1.73 per cent. Europe will reach zero population growth first in 2030 with a population of 500 million (50 million more than at present), followed by North America at 320 million by 2060, Soviet Union at 380 million in 2100, South Asia at 4.1 billion by 2100 (which is 3 times its present 1.4 billion), Latin America 1 24 billion (triple its present population) by 2100, East Asia 1.7 billion by 2090 and Africa at 2.1 billion (compared to the present 600 million) by 2100. The report points to the irreversible downward trend in the world population along with the annual increment of the world's population to continue for the rest of the century due to the fact, as it says, that "even a declining birth rate when applied to an ever expanding population base yields larger and larger increments in annual population."

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II Agricultural Development

Paddy and other crops

Farming operations, on completion of samba harvests, are turned in the state to the start of kuruvai operations. For the Thanjavur district, dependent on letting out of Mettur water, the middle of July will see the further development of rice nurseries and the initiation in some parts of Thanjavur and Tirunelveli of the

community nurseries. Samba paddy is reported as coming into the market at a slow pace so that the daily paddy arrivals for levy, deliveries at the collection centres of the State Civil Supplies Corporation were reported at 300 to 500 tonnes. The government suggested that this was an indication that paddy stocks were still being held back by farmers expecting better prices. By the end of May, the Civil Supplies Corporation had purchased 1.11 lakh tonnes of paddy by way of levy and the cooperatives 62,000 tonnes in the open market.

Research results

The Tamil Nadu Agricultural University has identified the 5 major diseases which affect the state's rice crop from rice blast to rise tungro virus and has developed the chemicals to control the diseases as well as the disease resistance varieties such as the replacement of ADT 10 susceptible to blast by GEB 24 and CO 4 and TKM 1, Vaigai, CO 40, 25 and 20 and TNAU (AD) 98. With regard to bacterial blight TKM 6 and IR 42 and for rice tungro virus TNAU 6262 and B6B have been developed. A new kind of rice seed provided with safeguards against imperfect germination that can be sown directly in the field has been developed in Japan and when introduced here will revolutionalise paddy breeding. Of the 18 per cent or Rs. 5,000 crores of national foodgrains production lost through poor handling, processing, storage and transportation (1973 survey), 70-80 per cent of the foodgrains are retained at the farm and here research shows that by a combination of the use of right types of receptacles and use of disinfectants, the loss can be reduced. Tamil Nadu Agricultural University has developed a high yielding cumbu resistant to downy mildew disease—CCH 9 with yield of 3,121 kg per hectare, drought resistant and with a wide range of adaptation to varying soil conditions in the state. Similarly the University conducted field experiments during the summer and monsoon seasons on maize, sorghum and ragi under irrigation and as a result, the best suited crops for the season in relation to spacing, nitrogen level and yield have been identified and broadcast to the farmers. Cluster beans research has shown that it is a multi-purpose legume, nutritionally good, a hardy good fodder and also a green manure, cultivable in the arid and semiarid parts of the country and the state. Crop breeding efforts have resulted in the selection of 11 promising accessions, two being prolific seed yielders—IC 9065 and 11521. Egg-plant research has concentrated on its pests and a number of disease resistant varieties have been developed—to leaky fruit rot, brijal shoot, fruit borer etc. Research in citrus fruits has developed starting with crossing Kumquat with Tahity lemon on to the hybrid with lime and pomello, confirming the genera that citrus and fortunella are close in their botanical relationship. Studies on animal power show that the maintenance of a pair of work animals under our low employment condition can be viable particularly when the farmers are the owners. It was seen that 60 days of employment yields a return of Rs. 8.85 per day employed, and 88 days' employment yields Rs. 31 38 per day employed. Better equipment increases productivity of the work animals and is economical compared to manual or mechanical power. Studies in dairy farming show that the actual income and milk derived is less than the published norm (Rs. 523 and 973 litres Vvs. Rs. 730 and 1,500 litres) which is due to not identifying beneficiaries who have some experience of handling dairy animals,

selection of poor quality animals and their poor up keep. The only positive element was the regular employment of the loan from the bank on which the project was based and which could be further improved by proper selection and training of beneficiaries. Research into the breeding of cattle shows that the major advantage of parturition is control of the time of calving which provides an opportunity to plan and control all phases of management system to ensure the highest rate of survival of cows and calves. The Tamil Nadu Agricultural University has started a quarterly journal on animal science for livestock growers in the state. It treats rightly animal husbandry including poultry and bee keeping as a small scale industry and is useful to farmers. Studies into use of honey bees suggests that a survey and determination of the bee flora in an area is a good starting point to be followed by introduction of appropriate plants to provide food to the honey bees throughout the year. This may involve some reorganisation of the tree planting programmes of various individuals and organisations in the locality. A cooperative project for use of the kerosene lamp for monitoring rice pests in a neighbouring country helped the farmers gain knowledge of the degree of pest incidence and provided them with a simple means of monitoring pest management. It also doubled the average yield of paddy in that area. This is a device which might well be started in this state. Research shows that cheaper insoluble forms of phosphatic compounds in the form of phosphate solubilizing microbes and phosphatic biofertilisers can be used to improve the flowering and fruiting of plants. Fertiliser consumption which was low in the drought year of 1979-80 has not picked up in 1980-81—a rise of 5.5 against the anticipated 18 per cent. For 1981-82 the offtake target of 6.7 million nutrients means an increase of 22 per cent which can be attained only by making fertiliser promotion part of T & U extension system. Ground water irrigation helps to diversify the crops that can be grown, growing paddy during the monsoons out of surplus well water and growing vegetables during the dry season as is demonstrated in some farms in this state. Sericulture is spreading to new areas in the state, with two species of silkworms—multivoltine and bivoltine—being reared. To protect the sericulturists against pests, a special insurance scheme is being tried out by the neighbouring state and should be spread to the 300 layings for each crop. The cashew research centre at Vridhachalam shows that 2 or 3 leaved terminal soft wood cuttings planted inside a polythene tent and provided with water sprays at normal intervals recorded for the cashew plant good root formation in 40 days from the time of planting. IIS is conducting research in tissue culture for the application of breeding improved varieties of tree crops of economic importance such as sandal wood, eucalyptus and rubber. What has achieved success in this tissue culture experiment is the sandalwood tree which is now being extended to other varieties.

Farm wages

Farm wages vary widely in the state. In most districts the demand for agricultural labour is seasonal and uneven due to low income, leading to transfer of land from small owners to the creditors, resulting in an increase in farm labour. To this should be added absentee landlordism in Thanjavur, decline in domestic industries in Trichi, and economic transition in Chingleput which adds to the farm labourers. Except in Thanjavur district, farm workers' unions have not developed well and so farm wages are low.

Storage

The state government has decided to create additional storage facilities for 1.7 lakh tonnes by creating 100 rural and 25 marketing godowns at a cost of Rs. 6.7 crores. This means that each of the reorganised village cooperatives in the state will have a godown—in addition to the existing cooperative storage capacity of 4.61 lakh tonnes. Upto the end of June 1980, the National Cooperative Development Corporation had sanctioned 3,518 rural and 300 marketing societies in the state.

Fish farming

Fibre glass boats fitted with inboard engines are to be supplied to fishermen in some of the coastal districts of the state as an experiment to diversify fishing activity. Poor fishermen are to be given catamarans and nylon fishing nets. Further to increase their efficiency, outboard engines are to be fitted to catamarans, inboard engines to vallams, and nylon webbings to country craft owners. Tamil Nadu Fisheries Development Corporation is to procure 4 new trawlers for deep sea fishing. It is also announced that the fishing landing jetty at Kodikara and infrastructural fishing facilities at Vaalinokkam and Pazhayar and Todi will be readied soon. The Tamil Nadu Fisheries Research Council has decided to increase the production of fingerlings by increasing the nursery areas and by setting up additional induced carp spawning centres. Brackish water lands will be used for prawn and fin fish culture. A pilot project on pearl culture in Tuticorin is to be launched. On the request of the industry, the Union Finance Ministry has under consideration grant of further excise duty concessions on HSD for deep sea fishing vessels in order to improve marine products exports.

Poultry farming

The Zonal Advisory Board of the lab and land programme of Karnataka, Kerala Tamil Nadu and Pondicherry met in Tiruchi in June and noted that dairying had gone a long way in improving the economic conditions of the landless labourers in Dindigul and Alasamtra. Sheep breeding was successful but poultry farming was facing problems due to high mortality of the fowls.

Tea

The Indian tea crop has registered a fall by 2.3 million kg during the first four months of 1981 compared to that period in 1980. North Indian production for the first four months at the end of April was 27.4 million kg being 5.6 million less than last year. The production in the South however showed some increase at 38.5 million kg against 35.2 million kg during the corresponding period last year. The export performance during this 4 month period showed an increase by 6.53 million kg at 18.75 million kg in 1981 compared to 12.22 million kg in 1980. In fact tea exports have earned Rs. 7.57 crores more during 1980-81 by exporting tea in value added forms and mainly by exporting tea to Poland, Soviet Russia, West Asia and North Africa. There is a new outlet for directly imported packet and quality tea in the US. The tea industry reports a serious situation caused by declining prices and escalating costs. UPASI has made a study of the estates in the South and its finding is that all estates in Kerala were in the red last year and for the current year their losses

exceeded Rs. 2 on every kg. Taking a cross section of estates whose average yield is about 30 per cent higher than the average production of 1,960 kg. per hectare, the costs show in 1980-81 stores consumed cost 26.6 per cent over 1979-80 and labour, taxes interest and marketing costs higher by 23-76 per cent. Therefore there is need for either a sharp increase in tea prices or substantial fiscal relief from the government, UPASI study concludes.

Coffee

As reported in the last issue, the coffee crop in 1980-81 is estimated at 1,15,000 to 1,20,000 tonnes against 1,59,000 tonnes in 1979-80. In regard to exports there are 2 problems. First is the question whether coffee exports can touch 80,000 tonnes in 1981-82 against 85,000 tonnes in 1980-81. The second problem is the steep fall in coffee prices which was Rs. 72,000 per tonne in 1971-72, Rs. 39,000 per tonne in 1977-78, Rs. 23,900 in 1980-81, in May 1981 Rs. 18,000 and in June Rs. 16,200. The unit value of Indian coffee exports will be much lower than last year. The export duty which was Rs. 700 per quintal in June 1980 and was reduced to Rs. 150 from December 1980 was rightly abolished in June 1981. ICO has imposed a world coffee cut of 10 per cent to stop the fall in prices. The world's largest producer, Brazil, will exceed last year's output. The reduction brings the overall export quota availability for the 1980-81 crop year to 53.5 million bags. So far coffee export quotas have been cut thrice this year and a fourth cut is expected.

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III Industrial Development

Industrial progress

For setting up industries in backward areas, Tamil Nadu received from the Union Rs. 15.48 crores in the past 5 years, being 15 per cent of the national allocation. It also received 35 letters of intent in 1979 and 52 in 1980 and industrial licences 26 and 37 in the 2 years. Among the state's small scale industries 955 are sick (20, 841 all India) and among large scale units 32 are sick. The industrial progress in the state is slow and not based on a plan.

Salem

Salem steel is now ready and could be the first public sector unit to be commissioned on time, if TNEB can assure the power supply. Owing to the power shortage, the Board was till June 20 supplying only 2,000 KVA against the plant's need for 4,000 KVA. For integrated running of the mill and syncronising of its various systems by early July, the power needed will be 8000 KVA, by August 9000 KVA and by September 11,000 KVA. With the monsoon now active in Kerala, Karnataka and Tamil Nadu, it is possible that the power demands can be met. So far Rs. 146 crores out of a total of Rs. 173 crores have been spent on the plant. The other issue under study by the Union government is whether the plant should be expanded into an integrated steel plant, or as the state government is urging base this expansion on the iron ore deposits at

Tiruvannamalai and Salem (see Vol. III p. 260). Such an explanation would mean employing 15,000 persons instead of the present 1,200 through ancillaries and even more important the establishment of a number of downstream units using the stainless steel production or steel scrap. This proposal which is under study of the Planning Commission faces the problem of resource constraint.

Neyveli

NLC reports that the first 210 Mw unit in the second thermal station will be commissioned by September 1984, the second unit of similar capacity by April 1985, and the third unit in September 1986. It signed in June a contract with an Italian firm for manufacture, supply, transport, erection, testing and commissioning of the 3 turbine generators of 210 Mw at a cost of Rs. 65 crores. Work on the second mine cut which will supply fuel to the station is on schedule. NLC has submitted to the Union government proposals for expanding the second mine from 4.7 million tonnes to 10.50 million tonnes and the thermal plant from 630 Mw to 1,470 Mw. Meanwhile lignite extraction at the open cast mine was a high 38,000 tonnes per day, which means that the year's target for the first time of 5.9 million tonnes will be exceeded. With all units of 600 Mw thermal plant in operation, generation exceeds 550 Mw. The urea production has reached its target and the diversification of the product is under study.

BHEL

BHEL is erecting in early 1983 India's first 500 Mw boiler at the Trombay power station and will be the major supplier of equipment for the super thermal plants. BHEL's quotation was the lowest in global tender called for the first two 500 Mw units of the Singrauli super thermal plant. It has also obtained the Rs. 70 crores first stage order for Farakka super thermal, under which it will supply three 200 Mw boiler sets. Its production target for 1980-81 is Rs. 284 crores against Rs. 254 crores for 1980-81 when its profits were Rs. 21 crores.

MFL

Madras Fertilisers which has a 750 tonnes a day ammonia plant, a 885 tonnes a day urea plant and a 3 train NPK plant with a capacity of 1,650 tonnes a day has proposed two expansions. One is one more train for NPK fertilisers costing Rs. 14 crores and the other is to double the capacity of the ammonia and urea plants at a cost of over Rs. 400 crores. The foreign share holders Amaco and National Iranian Oil Company who hold 49 per cent of the shares are against the expansion which needs a three-fourth majority. The Government of India which is the majority shareholder has questions about the feed stock which the expansion will require. It is at present getting its feed stock of naphtha from Madras Refineries which is doubling its capacity. the Union government is against setting up any further naphtha based fertiliser plants. The issue of MFL expansion needs further consideration. Its turnover in 1980-81 was a high Rs. 147.33 crores and profit Rs. 16.20 crores.

TAMIN

The Tamil Nadu Minerals Limited has launched a scheme to develop graphite

mining, beneficiation and graphite based industry in the state. Graphite deposits at Sivaganga run upto 16.5 km. The mining and beneficiation part will operate without difficulty as the surface exposure with overburden of 1-1 5 km at an estimated cost of Rs. 179 lakhs. Rs. 68 lakhs has been allocated for the current year for the mining and beneficiation aspects. The carbon based crucible plant—the third part—is a new technology to be found in UK, US and West Germany with one of whom the government and TAMIN will arrange the needed collaboration.

SIDCO

SIDCO is undertaking two programmes to assess small units. First as part of its Marketing Assistance Programme it is organising a series of buyer-seller meets for a specific range of goods. The first meet was in June when TI cycles and a large number of SSI came together as a result of which at least 100 small units are examining production of some of the 700 components which make up the cycle. Similarly it used the Rota Fair to get small units and TNEB together, it participates in DGS and D tenders on behalf of small units, and arranges coming together of SSI units and the Department of Education which requires 700 items for its 400 plus two schools. SIDCO's second programme relates to small sick units of which there are 955 in the state as noted earlier and on which SIDCO has identified as the cause the inability of the entrepreneur to bring in the additional equity expected of him. So SIDCO has introduced a margin money assistance scheme—interest free, with a 4 year moratorium. Also it proposes to develop project formulation services and assistance programmes to obtain clearances from other agencies which it has also identified as causing sickness.

B & C and Cotton

Buckingham and Carnatic Mills finally reopened on June 19, after a closure of 5½ months. 2000 workers, a fourth of the work force started the first shift which was readying the machine for operations, checking the machines and safety precautions. Within one week the full work force will be back at work and in 10 days full production will be resumed, producing 1.84 lakh metres of cloth and 7,000 towels by July 15. In view of its serious short supply, the state government has urged the Union government to make available short staple cotton in adequate quantity and at reasonable rates to the mills, which have reduced sharply their production of yarn of 40 counts and less leading to lay off handloom weavers.

LPG valves unit, Small match units and Chemical units

A small scale unit, Primeval Industries, to manufacture LPG valves and regulators to ISI standards has been set up in Coimbatore by 3 technocrats. They are a part of the LPG gas cylinder whose demand will expand rapidly with the Bombay High gas. The plant will produce 3 lakh sets of valves and regulators per annum and at the next stage will double the output. The Small Match Producers Service Industrial Cooperative Society at its annual meeting in Thayavur report loss of Rs. 34,788 in 1978-79, Rs 39,144 in 1979-80 and Rs. 86,860 in 1980-81. In 1979 120 units produced 39,100 bundles of matches, in 1980, 98 units produced 36,531 and in 1981, 30 units are in production. There is a certain amount of propaganda and exaggeration in these reports, but the small scale match units—unlike the cottage and mechanised units—are not doing well. The reasons for this

should be examined by a government appointed body. Similarly the chemical industry in the state reports being in a bad way because of high cost of production, flight of business out of the state, declining turnover and low capacity use. They point to what they call the archaic fiscal policies of the state. It is true that a Rs. 2 crore polyacetal resin unit which should have been established in Ranipet went outside the state, that the methanol based units face a gallonage fee of Rs. 1,300 per tonne, and that the 8 per cent sales tax at different points hits the chemical industry because the product of one unit is the raw material of another. This again is an industrial area that the Government commission should review.

Handloom

The total yarn production of 1,30,397 bales in April was 15.4 per cent less than the normal production and 5.7 per cent less than in March. The Tamil Nadu mills continued to face 50 per cent power cut in April. In view of the steep increase in yarn price, handloom weavers in Madurai in 116 handloom factories providing employment to 30,000 families closed from June 15. This closure of handloom units producing coarse count cloth has rendered 1 lakh handloom weavers jobless. On the urging of the handloom weavers and the state government, the Union government has directed the Cotton Corporation to supply 8,000 bales of cotton to NTC for hank yarn production for the Tamil Nadu handloom industry. CCI states that it will supply the cotton at prices lower than the market prices and will rush the stocks to Tamil Nadu. SIMA states that the mill could do little about the shortage of yarn or prices in view of their losses traceable to high cotton prices. In fact SIMA terms the CCI offer a hoax as the cotton prices quoted by it are shockingly high so that yarn made from it will cost Rs. 107.33 a bundle against the present mill price of Rs. 95. This again is a situation which the two governments and CCI should straighten out with SIMA so that the handloom weaver is back at work.

Leather

Leather exports in 1980-81 declined to Rs. 304 crores aginst the previous year's Rs. 424 crores, leading the government to cut the 1981-82 target from Rs. 480 crores to Rs. 425 crores. Leather exports have fallen by 28 per cent in April and May 1981 at Rs. 46.06 crores against Rs. 62.64 crores in April-May 1980. This means that the world slump in leather has not lifted and even the lower target for the year may not be attained. The worst affected are finished leathers which fell by 14 per cent and leather goods by 27 per cent. To add to the problem, it is reported that European importers of Indian leather have defaulted on payments in a big way or have unduly delayed settlement of bills. European currency problems in relation to the US dollar, tight money curbs in Europe, and import restrictions have added to the problem. Italy is one of the major defaulters. Japan however has emerged as a major importer of East India tanned leather and the reduction in export duty from 25 to 10 per cent has helped. One of the other problems is the pollution of Chennasamudram tank in Walajahpet as a result of toxic effluents of the 40 odd tanneries being let into the tank on which some 1,500 farming families depend for their livelihood. Now the government and the industry must act to restore the tank to its original state.

Private sector reports

The annual report of Lakshmi Machine Works for 1980-81 states that it had a turnover of Rs. 357.38 lakhs which was a growth of 22 per cent over 1979. It reports a net profit of Rs. 303.87 lakhs. Its bonus issue, it reports, was successful, and its exports Rs. 385.08 lakhs. It has received a letter of intent for manufacture of machines for which a second unit is set up in Kaniyur. The company's industrialisation programme is going well at a cost of Rs. 12 crores.

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IV Education, Science and Health

Unrest in educational institutions

June being a vacation month, students were at home and only 3 centres report disturbances. Annamalai University law students walked out of the examination hall on grounds that the question paper was difficult. The examination was being held because the earlier examination had been cancelled due to mass copying In Vellore students and staff of the Women's College were on strike, agitating against the management because the latter had not opened the college after vacation. Kashmir University which was the scene of violence in May (see last issue p. 338) witnessed in June the expulsion of 40 students, the rustication of one and heavy fine on another for gross misconduct and involvement in anti-national activities within the University campus.

Educational reform

The Central Board of Secondary Education announced in June that it is starting open schools this year to offer a second chance to thousands of school dropouts, working adults and housewives, provided they are above 14 years of age and had completed primary education. The schools will offer correspondence courses initially in English, Hindi and will enable students to enter the world of work while also studying and entering the higher education area. At a meeting of the Southern Education Ministers with the Union Minister, it was decided that private schools affiliated to the Central Board of Secondary Education will be derecognised if they are collecting capitation fees, donations and charging very high fees and using untrained teachers. To encourage vocational courses at the plus two stage, it was suggested that the Apprenticeship Act should be amended to cover those passing out of the vocational courses and to bring the vocational courses under the central sponsored scheme. There was a sharp difference between the states on whether education should be under the concurrent list. The Higher Secondary examinations results announced in June in the state showed that girls did better than the boys and the top places were taken by students from urban based schools—Madras, Coimbatore, Trichy and Pondicherry. The state government promulgated an ordinance in June making the employees in Panchayat Union schools government servants. The most important event in June was a meeting of Education Secretaries followed by a meeting of Education

Ministers preceded by a meeting of Vice-Chancellors. In a paper prepared for the meeting it is reported that enrolment in the age group 6-14 in 1979-80 was 905 lakhs and by the end of the Sixth Plan it will rise to 1,085 lakhs, when 95 per cent of the 6-11 age group and 50 per cent of the 12-14 age group will be enrolled. For classes 1-8 the enrolment will be 78.8 per cent compared to the present 67.2 per cent. On the basis of the 1981 census figures however, these percentages will be lower. More than universal enrolment, universal retention poses more serious problems, as even in educationally advanced states for every 100 children entering class 1, 63 drop out at the end of class 5 and 77 at the end of class 8. Normal education is then provided for the dropouts. Thus reasons for the non-retention power of the school is explained in terms of (a) unsatisfactory school structures like thatched huts, tents, etc., (b) lack of minimum furniture, (c) low teacher competence, (d) detention on the basis of annual examination, (e) single teacher schools and (f) inadequacy of elementary education administration. To build 16 lakh classrooms, Rs. 1,920 crores will be required. Out of 4.7 lakh primary schools, 1.62 lakhs have no mats or furniture, 1.88 lakhs have no blackboards and 2.82 lakhs have no drinking water facilities. For the country as a whole 60 per cent of teachers in primary and middle schools are trained but in some areas the percentage is as low as 23. Single teacher schools number 1.6 lakhs out of 4.74 lakh primary schools and when the teacher goes on leave the school is closed. The engineering and technological institutions are to be involved more actively in undertaking research on the problems of the community and in developing appropriate technology for rural areas. 35 community polytechnics have been established in the last 2 years. Plus 2 pattern is not yet followed in 5 states. The conference decided to undertake a review of textbooks from the national integration angle, starting with textbooks in history and languages. Primary education is to be universalised in 10 years (this has become a slogan) through formal and nonformal education, with emphasis on primary education in VI Plan and middle schools in VII Plan. It also highlighted the need for construction of school buildings and provision of equipment and furniture. It urged early switchover to the 10+2 pattern and a time bound plan for the conduct of surveys, preparation of curricula, institution of courses, teacher training etc. It endorsed the recommendation of the last meeting of the All India Council for Technical Education (see Vol. XI p. 285) to give a statutory status to the council to coordinate and determine standards and prevent undesirable proliferation of technical institutions and to base future expansions on scientific surveys of manpower needs. It also noted the decision of the Union ministry to introduce Union legislation to stop the practice of capitation fees in engineering and medical institutions. The conference of Vice Chancellors decided that all universities should switch over to a 3 year degree course, adopt a time bound programme to restructure the undergraduate courses on the lines suggested by UGC covering core, discipline and applied courses. The politicisation of the universities should be stopped and students and teachers should follow a voluntary code. UGC proposes to increase the number of working days in colleges from 180 (which is the exception in most universities) by making better use of the long vacation. In Edinburgh University the number of working days is 194 and Stanford 311. It has also urged universities to hold examinations on schedule. Against all these well meant resolutions, what is happening in the universities is the opposite. The North

East region is in a ferment because students are imbibing sub-standard education and cannot compete with students from some other states. After Gauhati, universities and centres were established in Dibrugarh, Shillong and Manipur and the story everywhere is one of deterioration. In Karnataka, the practice of capitation fees for medical and engineering college admissions and the start of new professional colleges is being operated with government approval. The Union minister of Health is of the view that the state government will reverse this practice. The Madurai Kamaraj University Teachers Association is concerned at the proposals of certain private colleges to close down some courses of study, which it regards as an attempt to victimise the staff and students. Madras university announced in June that as from 1982-83 community and social service (CSS) as part of the curriculum of the undergraduate and postgraduate courses will be dropped because of the difficulty of college teachers to assess the performance of the students in CSS. Annamalai University has given up the semester system in the arts and science faculty from this year because of the inadequate coverage of the syllabi due to frequent interruptions, late conduct of examinations, overlapping of the time lag and consequent late publication of results and the irksome nature of internal assessment. The only positive development to report is that 4 more colleges in Madras University have been granted autonomy by the UGC—Women's Christian College for all undergraduate courses and PG course in Home Science, Government College of Technology for PG courses in structural and mechanical engineering, Sri Ramakrishna Mission Vidyalaya Arts and Science College for all undergraduate courses and PG course in coooperation and social work, Ramakrishna Mission Teachers College in B.Ed. and M.Ed courses. In addition the Vivekananda College will get autonomy for all its undergraduate courses and its PG course in Mathematics. With this, 12 colleges of Madras University become autonomous. The state government has constituted a committee to examine the requests of Madras, Madurai and Annamalai for a rise in their block grant.

Mass media and Adult education

Bombay TV will be the first to have an additional channel for commercial programmes exclusively. In Tamil Nadu a committee has recommended the moving of the Directorate of Libraries from the Connemara Public Library and locate it in the DPI office and the shifting of the Children's Library to the District Central Library.

Technical education

The Madras University has decided to permit external registration for Ph. D. Programme in engineering for those working in well-equipped establishments which have facilities for research. Also students in the 4 year B.E and B.Tech courses are now permitted to switch over to the other course in the second year. The university has also approved the new electives in the 4 year course in Bio-medical instrumentation and Medical Diagnostic Therapeutic aids. Diploma holders in machine tool maintenance and repairs, in machine design and drafting and Rural and Mechanical Engineering and Rural and Civil engineering are now eligible for admission in part time courses in B.E., perm tting diploma holders in Chemical Technology to seek admission to the B.Tech course in Chemical engineering. Perarignar Anna University is introducing

2 new courses, M.Sc (Medical Physics) and M. Tech (Laser and Electro-optical engineering) from 1981-82.

Science

In June two important space science achievements were registered. The first was, as noted in the last issue, that on May 31, the country's first development flight SLV 3 was launched from Sriharikota and put the Rohini satellite into orbit. It was a successful launch upto the third stage; the fourth stage did not carry Rohini to its full height, so that after circulating at a lower orbit for 9 days, it burnt itself out. The second event was that the French Ariane launch vehicle carried India's first geostationary experimental telecommunications satellite, APPLE, on June 19 and by June 29 was in a circular 24-hour orbit 34,690 km above the earth. By the end of July it will be in a geostatinary 35,000 km circular orbit and will become operational, with the planned experiments such as the communication experiments using the time division multiple access, spread spectrum multiple access, TV with multiple audio, low cost and emergency communication terminals and computer interconnect conducted within its first year. ISRO proposes to set up a liquid propellant testing facility at Mahendragiri in Kanyakumari and it is being studied with a view to examining its develocment on forestry and wild life conservation. The National Information System for Science and Technology reports that it has established 4 secroral centres, (a) for food at the Central Food Technological Research Institute, Mysore, (b) for drugs at the Central Drug Research Institute, Lucknow, (c) for leather at the Central Leather Research Institute, Madras, and (d) for machine tools at the Central Machine Tools Institute, Bangalore. The Mysore centre serves as an Associate Institute of the UN University, as a Patent Inspection Centre for Indian patents and as the International Centre for Food Sciences and Technology (NICFOS). An Andhra engineer produced a substitute for cement using calcium carbide waste as hydraulic cement. It can be used for foundation and concrete construction. The Central Building Research Institute, Rourkee has evolved techniques for making thatched roofs fire retardant and mud plaster walls water proof. It is being demonstrated at Krishnagiri with the collaboration of the Rural Science Radio wing of Madras AIR Trichur engineering college reports that it has developed vegetable fibres like coir, arecanut and sisal as roofing substitutes for asbestos. The Pan Chrome chemicals has developed a new furnace design using a shaft kiln which saves a lot in fuel costs. The Department of Science and Technology reports that it has recognised 629 R & D units of industry involving an expenditure of Rs. 130 crores in 1980-81. Of the 2,870 R & D units in the private sector, 2,436 are in large and medium units, 118 in small units and the rest in research institutions.

Health

In June there was a 3 day joint conference of the Central Councils of Health and Family Welfare which approved the Draft national health policy, national population policy and the national medical and health education policy. The Prime Minister opening the conference called for a change in medical education to suit the community needs and for making population control a mass movement. The National Health Policy set forth an integrated approach to health with special reference to education, housing, water supply and sanitation. The

goal of Health for all by 2000 AD will be achieved by extending primary health care to all villages. A revised village health guides scheme for delivery of health care in the villages was also adopted. The national population policy set the goal of reducing the birth rate to 21 per 1,000 and death rate to 9 per 1,000 and infant mortality to 60 per 1,000 live births by 2000 AD. This implies protecting 60 per cent of couples in the reproductive age against the present 22.6 per cent. Full use is to be made of available practitioners of Indian systems of medicine which a Medical and Health Education Commission will ensure. Studies on protein foods show that groundnut, cotton seed, rape seed, sunflower, safflower, coconut, sesame, field bean, corn and leaf provide low cost foods for which there is great scope in the country. The state government which had not joined the previous scheme of community health workers has stated that it will implement the revised village health guides scheme provided the guides are not required to dispense medicines. The government announced that the 1981-82 targets, based on the quick demographic study by the State Family Welfare Bureau as a follow-up of the decennial census, are 2 lakh sterilisations, which has been further broken down by district for the 16 districts, along with a 7-point action covering motivational strategy, a late marriage campaign, information on MTP, purposeful use of community health workers, auxiliary nurses, midwives, and Primary Health Centres on family planning, organising public opinion, leaders camps, and ensuring use of mass media and intensification of the MCW programme.

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V Employment

The Union government has decided to set up a new committee on employment to review the employment and unemployment situation from time to time and suggest remedial action. The committee will also advise on matters on employment orientation in development policies and strategies, particularly in education and technology. It will also help review manpower and employment information system and advise how to bring about a wide dispersal of employment opportunities in the country. The government also proposes that Employment Exchanges should take up the work of providing self employment opportunities to job seekers, functioning as the nodal agency for the district manpower planning and employment generation councils. To allow job seekers registered for wage paid jobs to opt for self employment opportunities, specially trained vocational guidance agencies will be attached to employment exchanges and will assess applicants according to their aptitude and preference. The state government has requested the Union government to continue to allocate rice instead of cash for the state's food for work programme. In view of the drought conditions in the state, this request is particularly urgent and timely.

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VI Other Items

SRC and TNBCE

The two-monthly meeting of the Governing Board of the State Resource Centre met in early June. It reviewed the work of the centre over the two months since it met and instructed the centre to concentrate its work during the coming two months on training the government staff needed for its large scale programme of adult education within the programme of self sufficiency. An overall plan to select and train a small number of young persons as cadres for the adult education movement was discussed and approved. The Executive Committee of the Tamil Nadu Board of Continuing Education also met in early June and noted that all centres under NAEP had been closed for lack of Union government funding. It also reviewed the status of the bank loans it has guaranteed to young fishermen and the difficulties of ensuring their repayment. It reviewed and approved two income earning projects which are vocational training programmes into which literacy education has been built. It decided on the main outlines for the annual conference of the TNBCE and SRC.

Science and Technology Foundation

The final meeting of the Committee on the Science and Technology Foundation was held at the end of June, when the draft report setting forth the history and directive principles of the Foundation and some 210 projects in 15 broad fields were approved. The draft report also set forth the Council of the Foundation which will operate at (a) the working scientific level and (b) the state cabinet level to operate the Foundation. It is expected that the report will be presented to the government at the end of July.

NIPC & CD

A meeting of the National Institute of Public Cooperation and Child Development was held in June at which candidates for the vacant posts in child development, preschool education and regional directorate were interviewed and selected. It was noted that adequately qualified candidates in child development, as in social work are not available.

NAEP

An important meeting of the voluntary agencies participating in the National Adult Education Programme with a high power team led by the joint secretary of the Union Education Ministry and two members of the Directorate of Adult Education, New Delhi under the Chairmanship of Secretary and Commissioner to Government Education Department was held in late June in Madras. The meeting was called at the instance of the Union Ministry to discuss the quick evaluation by MIDS of the NAEP centres in Tamil Nadu run by voluntary agencies. The importance of the meeting was that the Joint Secretary declared officially that NAEP was being revived and the announcement to this effect would be made in a few days. The meeting reviewed the evaluation report which was found to be good and agreed to implement its recommendations.

IIEP

A meeting of the Executive Committee of the International Institute of Educational

Planning, Paris was held in Paris in June at which (a) the programme and budget for 1981 was revised and finalised, (b) the programme and possible resources for 1982 were reviewed and an outline established, and (c) the establishment of a short list of candidates for the Director's post was effected as the present director is retiring in October. The agenda and the major items of business for the Governing Body in December was also established.

July Development Seminar

"Fossil and non-fossil sources of energy with reference to the resources of Tamil Nadu", the paper presented by Prof. B. S. Murthy, Department of Mechanical Engineering, IIT, Madras to the July Seminar together with a summary of the discussion on the paper at the seminar chaired by Mr. S. L. Rao Managing Director, Mettur Beardsell Ltd. appears as the first article.

Second article

A paper, "Indian Economic Perspectives" appears as the second article.

M I D S News

The Executive and Governing Councils of the Institute met on August 7 and 8 respectively. These supreme policy making bodies of the Institute reviewed the performance of the Institute during the past year on the basis of the Director's Report. It was indicated in the report that the main thrust of the programme of the Institute apart from ongoing research projects was two fold: 1) to bring together scholars working on problems relating to the development of Tamil Nadu and 2) to initiate a series of programmes in collaboration with other institutions. Members of the Governing Council appreciated the efforts that the Institute has been making to stimulate research pertaining to the development of the State. They also appreciated and endorsed the decision of the Institute to communicate in simple language the main findings of research conducted by the members of the Institute. It was suggested that such publications should reach much larger audience and that as early as possible material should be brought out in Tamil also.

The two bodies also reviewed the financial performance and position of the Institute on the basis of the audited statement of accounts for 1980-81 and approved the budget for the financial year 1982-83 indicating also the broad lines along which the future work of the Institute should be shaped.

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Prof. Subbiah Kannappan, Department of Economics, Michigan State University, who is on a brief visit to Madras spent some time in the Institute on August 10, 1981. He also conducted a seminar on "Wages and Inequalities in Urban areas". His presentation led to a lively discussion.

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The following research publications have been brought out by the Institute during the last few months :

Working Papers

No. 15 A Mid Year Review of the Economy 1980—Malcolm S. Adiseshiah

No. 16 Rural Poverty : A Critique of the Sixth Plan's Approach—S. Guhan

No. 17 The 'Scale Factor' in Agriculture : An Analysis of Some Tamil Nadu Data—C. T. Kurien

No. 18 Female Labour in Small Industry : The Case of Export Garments – U. Kalpagam

Digest Series

No. 2 Labour Utilisation in Indian Agriculture : A Critical Appraisal of the Literature on Some Aspects of the Problem—Sarajit Majumdar

Popular Series

No. 2 A Primer on Poverty : India and Tamil Nadu—S G uhan

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Faculty Positions in the Institute

The Institute has senior Faculty positions (corresponding to Professors and Readers in the UGC scales of pay) for those with high professional competence and inclination for work on applied problems. At present the major areas of concern of the Institute are matters relating to the development of Tamil Nadu especially agriculture, industry and welfare schemes. Some studies pertaining to the country as a whole including inter-State comparative studies are also going on.

The Institute has provision also for short-term appointments for those interested in doing research on development problems. These posts are meant mainly for teachers in Universities and Colleges and similarly placed persons, and appointments can be made on a salary protection basis. Applications must be accompanied by an adequate research proposal.

Those interested in appointments in the Institute (regular and short-term) may correspond with the Director.

Fossil and Non-Fossil Sources of Energy with Reference to the Resources of Tamil Nadu*

B. S. MURTHY
Professor of Mechanical Engineering
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Introduction

This paper presents some of the energy options as a source of power for internal combustion engines from the fossil and non-fossil resources available in the state of Tamil Nadu.

With the acute shortage of fuels from petroleum resources and the steep price rise, there is an urgent necessity to take a real hard look at alternative sources of energy to replace or extend the use of petroleum based fuels.

In this lecture, the following alternatives which are viable to the state of Tamil Nadu are identified.

1. *Fossil carbon sources :*

   Utilization of Neyveli lignite for the manufacture of methanol which is known to be a clean burning fuel—well suited for internal combustion engines.

2. *Non-fossil carbon sources :*

   These sources are renewable and the promising fields are waste materials such as urban refuse, cattle dung, agricultural wastes and bio-mass. Possible bio-mass fuels are sugar-cane molasses, water hyacinth, paddy husk and some non-edible vegetable oils.

These serve as sources for gaseous and liquid fuels for internal combustion engines.

Potential of Neyveli lignite

Lignite or brown coal is an excellent raw material for the production of methanol. Burning raw lignite in a pulverized form does not seem to be an optimum way of energy conversion as the rich volatiles of lignite are wasted in combustion process. As early as 1955, studies were conducted at Annamalai University which revealed the rich potential of these volatiles. On the average, low temperature carbonisation experiments showed that one ton of dry lignite yielded (1) the following :

Char	—	11.39	CWT
Tar	—	23.72	gallons
Liquor	—	26.16	gallons
Gases	—	5391	cu. ft at 60°F and 30° in Hg
Ammonia	—	1.07 lb.	

*As the full paper of the July Seminar has not become available, its summary is being published.

The char breaks during handling. Therefore it is conveniently bricquetted to yield coherent pieces which is marketed as a solid fuel under the trade name 'Lico' and the by-products are marketed to chemical industries. But the bulk of lignite produced is burnt in a raw state in the pulverized form.

The possibility of gasification and subsequent synthesis to methanol seems to be a good case for study particularly as the expertise of lignite gasification is well known to Neyveli engineers.

Gasification of lignite

Literally dozens of procedures are available for gasification of coal. Winkler gasification process is the usual recommended process for lignite gasification.

In this process, the crushed lignite is dried and fed to a fluidized bed gasifier through a variable-speed screw feeder. The lignite reacts with oxygen and steam to produce a gas rich in carbon monoxide and hydrogen. Temperatures of the fluid bed are in the range of 1500° to 1800°F. Because of the high temperature, all tars and heavy hydrocarbons are reacted. Pressures are around atmospheric. About 70 per cent of the ash is carried over by the gas, and 30 per cent is removed from the bottom of the gasifier by the ash screw. Unreacted carbon carried over by the gas is converted by secondary steam and oxygen in the space above the fluidized bed. As a result, maximum temperature occurs above the fluidized bed. Gas is cooled by a radiant boiler section before it leaves the gasifier to prevent ash particles from melting and forming deposits in the ducts. Raw gas leaving the gasifier is passed through a further waste-heat recovery section. The fly-ash is removed by cyclones followed by a wet scrubber and finally an electrostatic precipitator. Gas is compressed and shifted, after which it is purified, methanated, dehydrated, and compressed further if necessary. The use of air in place of oxygen in the process produces a low heat-value gas.

Methanol manufacture from synthesis gas from lignite

The following is the basic synthesis reaction in the manufacture of methanol from the synthesis gas.

$$CO + 2H_2 \rightleftharpoons CH_3\ OH$$

Special catalysts and special conditions of temperatures and pressures are necessary for the formation of methanol according to this equation.

In the high pressure process, the conversion takes place at 340 atm. and 300°C in the presence of a zinc-chromium oxide catalyst. The low pressure process operates at pressures around 50 atm. and temperature of about 250°C. The highly selective copper based catalyst is used after purging the synthesis gas from sulphur and halogen compounds Use of 150 to 180 atmosphere and temperature of 340°C with zinc-chromite catalyst is the basis of the medium pressing process.

The energetics and economics of the lignite to methanol process is to be worked out as a first priority and a feasibility report prepared before a commercial project is proposed. This seems to be the first energy option to Tamil Nadu to replace petroleum based fuels for transportation purposes.

Fuels from renewable resources

Many scientific institutions in the state of Tamil Nadu are engaged with the problem of used renewable sources of energy. Indian Institute of Technology, Madras was the first adopt stationary diesel engines to work on bio-gas (2). Steps are under way at the Centre for Rural Development, Indian Institute of Technology, Madras to examine the factors improving the yield of bio-gas from the following sources:

1. Cattle dung
2. Human excreta
3. Water hyacinth
4. Household organic wastes, agricultural wastes and industrial wastes.

At AMM Murugappa Chettiar Research Centre studies are made to assess newer technologies for cheaper alcohol from molasses and bio-gas from water hyacinth (3, 4).

Use of paddy husk as a source of power generation and processings is an important field of study in regions with rich cultivation of paddy. Regional Centre for Modernisation of Rice Mills, Annamalai University, Tamil Nadu, is engaged in studying this aspect and have offered some designs of furnaces to burn paddy husk (5).

Vegetable oils from non-edible sources are valuable for leather and chemical industries. However, it is necessary to assess whether all the resources like rice bran oil and oils from other sources are exploited in Tamil Nadu. It is likely that if some of these oils are not needed, these will be suitable as diesel fuel. At IIT, Madras, experiments are conducted to assess the performance of diesel engines with vegetable oils and alcohols.

Alcohols and biogas as engine fuels

Should alcohols and biogas be available in plenty, it is possible to adopt both diesel and petrol engines to work on these fuels.

The differences between the use of neat alcohols and petrol are summarised below :

Thermal Efficiency/Fuel Economy : Thermal efficiency is potentially better with alcohols because they have more favourable thermochemical properties, can be burned leaner, and can operate at higher useful compression ratios. However, as a direct result of the lower energy content of alcohols, fewer miles per gallon will be obtained. Methanol has about half the energy content per unit volume of gasoline, ethanol about two-thirds, and higher alcohols from three-fourths to seven-eighths.

Exhaust Emission of unburned fuel and carbon monoxide are practically the same when methanol and gasoline are compared at the same relative mixture strength. Aldehyde emissions are higher with methanol and nitrogen oxides are lower than with gasoline.

Driveability, except for starting quality, has not been investigated thoroughly. Starting a methanol-fuelled, carburated engine below 50° F ambient temperature requires a special starting aid, such as a volatile additive or an auxiliary volatile

fuel. Even with combustion aids starting below 20°F is extremely difficult.

Compatibility with materials currently used in the manufacture of fuel system components for use with gasoline has been found to be poor with alcohols. Terneplate (a common fuel tank material), copper, and brass show evidence of increased corrosion and some rubbers and plastics show increased softening or swelling.

Upto 20 per cent methanol in gasoline can be used in present spark-ignition engines with no extensive engine modifications. The performance characteristics of blends in unmodified cars are predictable from the relatively leaner air-fuel mixtures they produce.

Thermal Efficiency/Fuel Economy: The thermal efficiency increases especially in those cars with rich mixture calibrations; however, fuel economy in miles per gallon decreases proportionally to the amount in the blend.

Exhaust Emissions change to the same extent they would have changed using gasoline, if the carburettor were adjusted to an equivalent leaner mixture strength. Therefore, unburned hydrocarbons and carbon monoxide are reduced somewhat (particularly in older cars originally set rich). Aldehyde emissions are higher for methanol blends as compared with neat gasoline, NO_x emissions are not significantly affected.

Driveability and vapor lock problems may occur with some frequency when using gasoline blends.

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Summary of Discussion

The discussion in the seminar centred mainly around the economic viability, as distinct from technological feasibility, of the scheme presented by the author. It was pointed out that conversion of lignite to methanol, and the burning of the latter to get power may be more efficient than the direct burning of lignite to get power, in a strict technical sense of the term, but it may not be so in an economic sense, given the resource endowments and costs in the country: it was pointed out that the cost considerations of the pilot plant proposed by the author—an investment of nearly one billion dollars in plant and machinery to produce 7,000 tonnes of methanol per day, at 56 cents/gallon of methanol for the plant to break even—would make the scheme a rather unattractive one economically, *at least in the short* run. It was also pointed out that the *production* by this plant—7,000 tonnes of methanol per day—accounts for a very small proportion of the fuel consumption in our economy.

The author's reply to these questions was that even though the scheme may not look worthwhile in the short run, its potentialities in the long run should not be underestimated, and this for the following reasons:

1. As known at present, the coal reserves in India are much higher than the oil reserves; and production of ethanol from sugarcane is out of question in India given the high population pressure on land.

2. The oil prices in the international market are likely to increase at a rapid pace in the coming years, altering cost-benefit considerations in the long run.

3. Conversion of lignite to methanol yields some important by-products; direct burning of lignite would mean foregoing these.

Regarding the last point, viz., that the scheme as proposed, at 7,000 tonnes of methanol per day, can hardly make any appreciable dent in our overall fuel consumption, the author pointed out that:

1. A major part of the rural energy needs in our economy can be met mostly from non-fossil fuels like bio-gas.

2. The use of methanol would be restricted to only those uses where mobility would be involved—like in the transport sector. Even here, it would be a substitute only for diesel and not for gasoline.

When the author mentioned that gasification of coal is being done in South Africa, some participants pointed out that it is being done at a very high cost there—more for political reasons than for economic reasons.

After the discussion, there was a slide show on the experiments being conducted by the author and his colleagues on the use of ethanol in internal combustion engines.

Mr. S. L. Rao chaired the session.

Indian Economic Perspectives*

Preparatory

I am honoured at being invited to deliver the Motilal Nehru National Unity Centre-Andhra Pradesh Sahitya Akademi Lecture this year. Motilal Nehru, whose memory we commemorate once again today, was a many faceted diamond whose solidity was based on his sense of the oneness of this vast country, with its many diverse cultures and peoples, and a perspective of what this country and its people would achieve when free to express themselves. We inherit from Motilal Nehru this ineffable sense of perspective, whether it be in planning our economic development futures or in the encyclopaedic knowledge and intellectual and spiritual insights which he recalls to us as our cultural tradition, now being preserved, projected and promoted by the Andhra Pradesh Sahitya Akademi for Andhras and Indians everywhere. It is in recognition of these realities represented by Motilal Nehru and the Sahitya Akademic that I have selected as the subject of my lecture—Indian Economic Perspectives.

The India that we refer to is both old and new. In terms of history and geography and expressed as culture it harks back into prehistory: When the Himalayas erupted and when the Indo-Gangetic Plain was formed, when the Dravidian cultures interacted with the incoming Aryans, when Indian culture as expressed in the classics like Tolkappiam or the Vedas breaks on the world like the Indian dawn, as suddenly as the sun rises in a flash pulling aside the curtain of darkness. The India that I refer to in this lecture is continuous with this hoary historical, proto-historical and pre-historical past on the one hand, and is the vast sub-continent teeming with over one in seven persons who inhabit this planet, representing a variety of religions and customs, speaking many languages and dialects, but all bound together in the common Indian bond of trying to make this land a base for living the ordinary everyday life of its people, on the other In this mode and manner of living, the past and present, history and current events coalesce to make the India of today.

I have chosen for my lecture the economic facet of India for two rather simple reasons. For one thing, the study of the economy has been my single speciality for well over half a century as a student, teacher and researcher. I know really little else. Second, and here I may not have the sympathy of many of you, I am at home when dealing with facts and figures, with measurable statistical quantities, knowing full well the serious limits of this approach. And those limits are that the economist is confined to analysing

*Extracts from the address delivered by Malcolm S. Adiseshiah at the Motilal Nehru Unity Centre-Andhra Pradesh Sahitya Akademi Lecture on January 24, 1981.

data, checking correlations and cause and effect relations, indicating various options or alternative courses of action. Decisions, however, to do this rather than that, to choose a certain course of action lie outside its sphere.

It is in this context that the perspective approach enters. When we speak of economic perspective, we speak of the movement, behaviour and state of the economy over a period of time which is neither short term when the quantities are known or can be derived, nor very long term when nothing measurable can be established where everything is left to one's imagination. Indian economic perspectives as in this lecture, refer to the possible state of the economy over a period of 15 to 20 years. In the four of the Five Year Plan documents, there has been a chapter titled the Perspective Plan, in which the broad contours of the economy in the next 15 to 20 years are outlined. Unlike this familiar outline, in this lecture I will set forth some three alternative scenarios of the Indian economy 20 years from now—that is in 2001 AD. This year, 2001 AD, is a convenient cut off point for many reasons, the most important of which is that it is the turn of the century and there is value in looking at what are the alternative statuses and scenarios available to us, from which we can now choose in order to shape our future.

And that is the value of this attempt at filling out India's economic perspectives in 2001 AD. It can provide us the basis for current decisions. It can help us to choose what we regard as our preferred future, denying any fatalistic or predestined or predetermined thinking or action or non-action based on it. There is also another very practical reason for this profile of the Indian economy in 2001. In our key economic sectors—power, irrigation, iron and steel, ferrous metals, coal, crude, heavy chemicals, fertilisers, shipping and transport, the normal gestation period after the decision to invest in any one of them is taken in some 10 to 15 years. (I leave out of account the scandalous 20-25 years time lag of 150 major irrigation schemes revealed in parliament by the government in November last.) Thus if a certain scenario of power or agricultural output or steel production is preferred in 2001, investment decisions on them must be made now in the VI Plan to realise that scenario. Finally with the overhang of mass poverty and mass unemployment which are the consequences of our unequal and unjust social and economic relations, the attainment of a less unequal society with reduced or nil poverty and unemployment can be chalked out in terms of political decisions on the one hand and economic growth rates on the other that that preferred Indian economy in 2001 will involve in the intervening twenty years.

I shall on this basis present a disaggregated perspective of the Indian economy in 2001 AD in terms of:

—Population and Employment
—Food requirements and Agriculture
—Industry
—Overall economic growth
—Savings and investment
—Science and technology
—Social structure

Population and Employment

Using the estimates of the Registrar General of Census[1], we have three

options with regard to our population size in 2001. The low estimate ranges over 820 millions to 846 millions, the medium estimate 924 millions to 945 millions, and the high estimate 996 millions to 1,032 millions. This means that under any of the 3 assumptions, our population will double from the 1971 base of 548 million around 2010 to 2025 AD, after which the increase slows down, the actual rate of population increase after 2,001 varying with (a) the rate of falling mortality which will be steep after life expectancy rises from the present 50 years to 60 years, and (b) the rate of fertility decline which depends on the marriage age, number of children per family, and the practice of family planning, where Kerala is the model for all of us. Kerala with a comprehensive health service and the highest education and literacy rates in the country has reached the goal of 1 per cent rate of population increase—which is a mark of the industrialised countries.

The labour force in 2001 in the age group 16-64 will vary between 392-412 million depending on which of the 3 population hypotheses is adopted. This volume of, what is called, labour force participation, will depend for each age-sex group on the rate of industrialisation, urbanisation and education. Particularly in the case of women, their participation which is around 20 to 24 per cent in urban areas shoots up to around 53 to 55 per cent in rural areas, and as India becomes more urbanised in 2001 (a doubling of our urbanisation is forecast), women's participation in the labour force will decline. So also will the participation of the 10-14, 15-19 and 20-24 age groups as education effectively expands. On employment, depending on the distribution of investment among the main industrial subsectors (capital, heavy, intermediate and consumer goods) and productivity gains, the employment perspective in 2001 varies between 66 million and 525 millions, the last showing a state of over-employment.[2] The Planning Commission using labour-output coefficients suggests by 2001 AD (a) near full employment in the sense that the demand for labour in standard person years will match the supply, while (b) a high rate of educated unemployment continues and worsens, and (c) the draining abroad of middle level skilled workers—carpenters, mechanics, masons and welders.[3]

Food requirements and Agricultural production

Food requirements in 2001 AD will depend on (a) the size of the population that I have just outlined, (b) the income and expenditure pattern of various population groups which will be referred to later and (c) the break-up of the food expenditures into expenditures on (i) foodgrains, (ii) sugar and oil and (iii) milk, meat, fruits and vegetables. On this basis the demand for foodgrains in 2001 will vary from 184 million tonnes for the low population—low income hypotheses to 261 million tonnes for the high population—high income scenario. It will be noted that this latter demand of 261 million tonnes is double the foodgrains output expected this year of 130 million tonnes. On the other hand if a low income-high population hypothesis is adopted, the demand for food grains will be 234 million tonnes, while for a high income—low population alternative the foodgrains requirement will be 214 million tonnes. The demand for the other food items referred to earlier will vary with the income level of the various groups. Thus the central food requirement item—foodgrains

—will, in terms of *output*, need to be in the 200 million to 260 million tonnes range.[4] This scenario also accords with the Planning Commission's Perspectives for 1992-93.[5]

What of the supply to meet this demand? Agricultural production comprising food-grains output and commercial crops will in 2001 depend less on extension of cultivable land, as all such lands have been brought under cultivation, but more on increases in productivity through scientific crop rotation, increase in multiple cropping, increased availability of irrigation facilities, increased use of the inputs of high yielding variety seeds, fertilisers and pesticides, increase in subsidiary farming activities such as fishery, poultry farming and animal husbandry and increased investments in land improvements, improved and extended agricultural research and institutional reforms, particularly land reforms, the delivery of minimum required credit to small and marginal farmers, consolidation of holdings and effective realignment of water channels. On this basis in 2001, gross cropped area will increase by 42 million hectares to 230 million hectares, with a small percentage decline of the area under foodgrains, as a result both of increased productivity and the increased demand for cash crops. Irrigation will have doubled to 100 million hectares which is near the full irrigation potential of 113.5 million hectares. Food-grains production then in 2001 will vary between 200 million tonnes and 250 million tonnes, depending on the extent of the realisation of technically realisable potentials in the various states, (even in Punjab for instance the average wheat yield can be doubled, and in other states it can be raised 3 to 7 times, kharif rice can be raised in different states 2 to 13 times, rabi rice 2 to 3½ times, jowar 2 to 11 times, maize 2 to 10 times, groundnut 3½ to 5½ times and potato yields 1½ to 5½ times). Other vistas of further increased production lie *in biological fixation* of nitrogen, genetic and chemical control of weeds and pests, and the developing technology of semi arid zones which include HYV sorghum, millet and pulses, ridge cultivation, optimum sloping of land and the recycling of run off water.[6]

Similarly the output of commercial crops, sugarcane, jute, maesta, cotton, oil seeds, tea and coffee will by 2001 grow by 50-100 per cent, standing at 200 million tonnes for sugarcane, 140 lakh bales for jute and maesta, 170 lakh bales for cotton, 210 lakh tonnes for oil seeds, 1,200 million kg for tea and 2 lakh tonnes for coffee.

It will be noted that foodgrain production in 2001 will be inadequate to meet the demand under the high income—high population hypotheses. And to simplify my presentation, I have not used the scenario approach for the gross cropped area estimate, irrigation prospects and commercial crops yields in 2001. My general conclusion is that we will be very near the edge in our food production in relation to the demand for food at the turn of the century, and hence action must now be intensified to stay within the population parameters indicated on the one hand, and actualise the targets for irrigation, research into and availability of seeds, fertilisers and pesticides and the land reforms, on the other, if a serious shortage is to be avoided.

Industry

The industrial profile of the country in 2001 AD will vary in accordance with

(a) the relative emphasis placed on basic industries, capital goods industries, intermediate goods industries, and consumer goods industries, and (b) the overall rate of growth of the economy. Since the Second Plan there has been priority to and major investments in heavy industry (which include the first 2 groups), while agriculture, irrigation, power and small and village industries have also been accorded priorities in investment decisions. On the assumption that this trend of industrialisation with a special emphasis on heavy industry will continue, it is possible to indicate the range of output of the major industrial sectors, which in turn will vary with the rate of overall economic growth ranging from the current actual 3.5 per cent to a possible 9 per cent.

Under these conditions, coal production will nearly quadruple to range from 375 million tonnes to 420 million tonnes, iron ore will increase from the present 45 million tonnes to 105-120 million tonnes, mild steel from 7.5 million tonnes to 32-34 million tonnes, power from 100 billion units to 540-600 billion units, railway freight from 230 million tonnes to 665-700 million tonnes, crude oil from 12 million tonnes to 22-24 million tonnes, petroleum products from 25 million tonnes to 80-90 million tonnes, nitrogenous fertilisers from 2,000,000 tonnes to 10,000,000 tonnes - 12,000,000 tonnes, phosphatic fertilisers from 650 thousand tonnes to 3,700,000 to 4,000,000 tonnes, cement from 22 million tonnes to 80-90 million tonnes, and cloth from 10,000 million metres to 25,000-28,000 million metres. These estimates are consistent with the long term perspective estimates of the Planning Commisson.[7]

The foreign trade implications of the above alternative scenarios for 2001 AD, on the imports side include crude oil which is now 16 million tonnes being kept town to 26-30 million tonnes, about 4-5 million tonnes of petroleum products, about 1.2—1.5 million tonnes of fertilisers, 3 million tonnes of coking coal for the Vishakapatnam steel plant and 300-350 thousand tonnes of non-ferrous metals, with the import substitution programmes leading to a sharp decline in these imports at the turn of the century; exports will be maintained at 7-10 per cent, expanding both traditionals like textiles, tea, leather and coffee with more emphasis on value added exports and non-traditional manufactures like engineering goods, machinery and spares and processed marine products.

Energy

Our energy needs and resources may be classified into (a) commercial energy comprising coal, crude oil, natural gas, electricity (hydel, thermal and nuclear energy), (b) non-commercial energy comprising firewood, animal waste, vegetable waste and bio fuels, animal and human power, and (c) non-conventional energy comprising wind power, solar radiation, ocean thermal gradient and tidal energy. On the energy situation in 2001 certain assumptions need to be made clear.

The first is that in place of the unplanned development of energy use to date, under which we are using commercial energy to the extent of 57 per cent of total energy and non-commercial energy to the extent of 43 per cent[8], allowing commercial energy to increase at 5 6 per cent per annum, there will be a clear agreed energy policy during the two decades

ahead of us.[9] (One urgency for this is that our crude oil import bill has reached this year a staggering Rs. 4,930 crores which is 70 per cent of our export target of Rs. 7,000 crores, and on top of it with the enormous damage caused to their oil industry in the Iran-Iraq war a doubt whether this level of crude supply will be available at all.)

The second is in framing the energy policy, we have three scenarios from which we can choose. Scenario I would be growing and high rates of per capita energy consumption, along with high efficiency of energy transformation, transportation, and communication, involving very careful management of scarce and dwindling non-renewable energy resources at a mounting cost. This is the Fuel Policy Committee option which despite its call for economy in energy use, forecasts an oil consumption of 69 million tonnes by 2001 AD, which is a 3.9 per cent annual compound growth rate over current consumption and an import bill of Rs. 9,000 crores (at $ 30 a barrel) to Rs. 30,000 crores (at $100 a barrel). Scenario II would be growing and accelerating per capita energy use, along with a gradual phasing out of mechanical energy, calling for retooling of all industry, primary, secondary and tertiary, to attain the objectives of thermo dynamic thrift. This is the option set forth in the Draft Plan 1978-83 which foresees petroleum product consumption of 36.32 million tonnes, coal consumption of 150.50 million tonnes, and electricity use of 44,626 MW by 1982-83.

Scenario III, which is my preferred option is a low energy technology economy, with a social and individual ceiling on energy use and the choice of life styles and cultures that would make it possible, involving: (a) keeping down the consumption of crude oil and its products at 46-50 million tonnes in 2001, which calls for a ceiling on oil consumption on the 7 oil intensive industries of textiles, fertilisers, heavy chemicals, pulp and paper, non-ferrous metals, iron and steel, cement, a ceiling on crude use by the transport sector which by better maintenance and driving can save 20 per cent, switching pumpsets to electricity and pricing energy to ensure both conservation and rational use; (b) switching from crude oil and its products to coal wherever possible, including in the railways; (c) increasing capacity use of electricity stations and pricing electricity properly; (d) intensifying research into non-conventional sources of energy—solar energy which by 2001 will be used for domestic purposes and irrigation, wind energy for running cost effective mills for pumping and power generation, and geothermal and tidal energy and fuel for our nuclear reactors; and (e) replacing kerosene and diesel use by using bio gas plants (which also save on the wasteful use of our 400 million tonnes of cow dung) and energy plantations so that our tradition to use bio fuels and bio mass energy will be further brought into play.[10]

This preferred scenario, in other words, means that by 2001 the concept of the total energy system will be in use to increase our thermal plant efficiency from the current 40 per cent to 75-80 per cent, and to extend the system to the plentiful products of photo synthesis which will be in full use then.

Science and Technology

Science and technology expenditures which now constitute 0.63 per cent of the

Gross National Product (GNP) will be above 1 per cent of GNP in 2001 AD. By then the Science and Technology effort of the country would have resulted in attaining the objective of technological and economic self reliance and would be concentrated on the national priorities of poverty eradication, employment generation and the move towards the creation of a less unequal society.

In referring to the preferred Science and Technology scenario for 2001, there are two important decisions which are of concern to our science futures. On the basis of the work of a special committee which reviewed existing legislation and administrative arrangements on environmental protection and recommended means of improving our environmental quality and the maintenance of an ecological balance, a new Department of Environment has been set up With the agricultural and industrial production scenarios outlined earlier, the need to protect our environment, provide essential safeguards against the resulting pollution of our rivers and water, air and land and mountains for a viable biosphere will be coming to a head around the turn of the century, and this new department will have a decisive role in ensuring the desired future.

The other activity which bears on 2001 is the futures studies being undertaken and promoted by the Department of Science and Technology wherein the various scenarios for 2001 are being developed. These include "the India Model 2000 AD" which is a computerised long range research study, which outlines various data based options between which we can choose as well as future scenarios on materials, pest control and agricultural chemicals, textiles and urban futures, cooperative futures, water futures, ocean futures, urban immigration, bus, transport, and the employment potential of housing.[11] Thus our perspectives for 2001 AD are being clearly set forth and on that basis current decisions can be made by all of us—government, public and private bodies including entrepreneurs and farmers, scientists and research institutions.

Savings and Investment

In this area of savings and investment, there has been an unexpected and still unexplained breakthrough. To attain the top scenarios of agricultural and industrial production, outlined earlier, our rate of saving in 2001 will have to be 24.5 per cent to 35 per cent of GNP. On the basis of the fact that the country's domestic savings was 5.4 per cent of GNP upto 1953-54 and rose to 11.9 per cent in 1966-67 and stayed there till the early seventies, most economists drew the conclusion that this rate of savings (24.5 to 35 per cent) cannot be attained. In fact it was stated that the Planning Commission's Draft Fifth Five year Plan forecast of pushing up the rate of savings (and capital formation) from 13.7 per cent of GNP in 1973-74 to 19.7 per cent of GNP in 1985-86,[12] "cannot be achieved in practice, atleast not on the basis of domestic savings because it is not possible under the conditions prevalent in India to push up the domestic savings ratios to sharply higher levels".[13]

However since 1975-76 our gross savings have shot up above 20 per cent and have remained at between 20.7 per cent to 24.6 per cent.[14] Why this high rate of savings, which is a feature of

industrialised countries, has not counteracted stagnation in our economy and has not led to high growth rates and a steady rise in industrial development is an issue that I will deal with in the next section.

All that I wish to say here is that rate of savings required for the scenarios that I have outlined for 2001 varies from 16 per cent (which is well below our current rate of savings) to 25 per cent of GNP which can be attained at the present rate of increase in our savings. My own preferred option which I have described as scenario III requires a savings rate of 24.5 per cent, which we have already surpassed in 1979-80 at 24.6 per cent.

Overall economic growth

The overall growth of the economy can be depicted under three scenarios. Scenario I is the economy increasing at an average 9 per cent per annum which will increase per capita incomes at constant prices from Rs. 922 in 1978-79 to Rs. 4,922 by 2001. Scenario II is the economy increasing at an average 7 per cent rate under which per capita income will increase from Rs. 922 in 1978-79 to Rs. 2,980 in 2001. Scenario III is the economy increasing at an annual average rate of 5 per cent under which per capita income increases from Rs. 922 in 1978-79 to Rs. 1,793 by 2001 AD.

There are many underlying implications and assumptions of these 3 scenarios, including rates of urbanisation, population growth, capital output ratios, structural issues etc. Here I wish to deal briefly with two issues.

The first issue relates to the explanation of the paradox referred to earlier, namely the coexistence of high rates of savings and investment and low rates of economic growth which has now characterised our country for 5 years from 1975-76 to 1979-80. The reason for this contradiction is broadly two-fold. One is the incredibly wasteful use of our savings and investment in buying up land, jewellery, buildings (in which we have used our large foreign remittances), in building up inventories, the increasing gestation period of our projects, the large unutilised capacity in each industry including agriculture, the import of inappropriate foreign technology and the disproportionality in our production structure. The other reason is the narrowness of the domestic market pointed out by the Draft Sixth Plan 1978-83, which refers to the fact that somewhere between 60-80 per cent of our people do not have the purchasing power which the market demands, so that ' an unduly large share of resources is absorbed in production which relates directly or indirectly to maintaining or improving the living standards of the higher income groups". The narrowness of the market prevents increased production and rising growth rates.

The second issue is the reason for my preferred scenario being the modest scenario III, which I have hinted at earlier, is the extra economic consideration of what I call our life styles and quality of life. The first two scenarios with their higher growth rates and the possibility they afford of quicker realisation of poverty amelioration is attractive; but I have seen what such rapid rates of economic growth does to people's culture, aspirations, creativity—in short what I call our life style. I prefer the 5 per cent rate of growth, but there is no reason why the rate of poverty eradication under that scenario should be slower, if combined with a committed programme of social justice to which I now finally turn.

Social structure

What will be the kind of society that we will have in 2001 AD ? Today, as our government announced in the last session of parliament, we have a society in which 305 million of our fellow men, women and children live in poverty—with inadequate food, with malnutrition, ill health, illiteracy, little or no housing and impure drinking water—not being able to earn and spend the minimum Rs. 50 per person per month. But poverty per se is not our problem; it is the poverty of the many and the richness of the few, the poor growing poorer and the rich getting richer which is our problem: as the Draft Sixth Plan puts it "the concentration of economic power has increased in the sense that within the corporate sector the assets of bigger corporations have increased more rapidly". As for rural inequalities the latest (1980 NCAER) study on income distribution points out that while the bottom 50 per cent of our rural people share 6.8 per cent of rural wealth, the top 1 per cent own 14 per cent of lands and other rural assets.[15]

The scenarios in regard to the kind of society that we will have in 2001, in regard to social justice at that time is not a matter for mathematical modelling or statistical forecasting. We can continue on our present path of writing socialism into our constitution and preaching it at the time of elections, and continue the inequitable land and industrial property ownership which results in growing poverty for the majority and growing richness for the few: or we can change our property laws, assets ownership so that the means of production are publicly owned and publicaly (not bureaucratically) managed, and in the meanwhile operate a massive programme of public works so that the domestic market is widened. The society of 2001 awaits decisions on property and income inequality relations now. That is the call, I believe, that Motilal Nehru would want us to respond to as the 1938 Congress National Planning Committee under the leadership of his son did.[16] Will we?

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Future Publications

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Other Publications

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1.	Techniques of Perspective Planning	Malcolm S. Adiseshiah (Ed.)	1972
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